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MANUAL TRAINING

IN THE

PUBLIC SCHOOLS

BY

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PREFATORY NOTE.

The two papers which follow were prepared for the New York Conference of Educational Workers and read at a quarterly meeting of the Conference held on October 24, 1889. They are now printed in the EDUCATIONAL MONOGRAPHS Series by authority and direction of the Executive Committee of the Conference.

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What Manual Training Should be Introduced into the Public Schools.

In attempting this paper the writer has been constantly aware of the difficulty of his task. To lay out a scheme of manual work which will fit into the present conditions of our school system; one which will in each stage be perfectly adapted to the development of the pupil and which will, as a whole, be comprehensive and harmonious, is not yet possible. No one can elaborate such a scheme to-day; it will only be after years of experiment that the possibilities of these new methods will be developed and the different elements fitted and smoothed into place. It is difficult, in fact impossible, for one person to speak with authority on the exact relations of the various means which have been employed, for while well-adapted courses have been developed in many of the school grades, in no single instance have all these most approved and most thoroughly tested methods been united into a complete system. Nor has it been possible for any single person to come in actual working contact with all of these methods, and it is only from those in such close contact, from the workers, that a natural and harmonious system of manual training can come. This paper, consequently, is offered more in the hope that it may serve as a basis of discussion, leading to the improvement of its suggestions, than for the ultimate good it may contain. Although the full benefit of manual training is only realized when its spirit

enters into all the exercises of the school-room and finds expression in them all, this paper will not attempt to deal with the new methods introduced into the study of language, number and geography, but will confine itself to the more special occupations of hand-work.

Taking a view of the entire system of what may be called popular education, from the kindergarten through the high school, we find in the two extremes of the scale the problem of manual training to a great extent solved, with methods fairly defined and tested by years of practice; but in the middle period, that of the primary and grammer schools, we are compelled to admit that the problem is still in the experimental stage. But assuredly, if the new methods are to affect broadly the educational work of the country it is here that they must be developed and perfected. It is undeniable that much of the present vagueness of system and lack of uniformity in the work attempted in the primary and grammar grades comes from the fact that the problem of this work was attempted after the kindergarten and manual training methods had become prominent. There has been from the first a tendency to draw methods up from below and down from above, rather than to meet the needs of each stage from a study of its own conditions. The exercises of the kindergarten have been used in the primary grades and the work of the manual training school attempted in the upper classes of the grammar school. This violation of the first principle of pedagogy, adaptation of method to the intellectual calibre of the pupil, has doubtless hindered the development of hand-work courses suited to the primary and grammar grades.

Leaving aside then the work of the kindergarten, which has had the advantage of so many years of study and the labor of so many workers, we may consider the first year of the primary grades. Here the work must be of the simplest character. There can be very little application of

thought on the part of the pupil, for as yet there is very little thought-power developed in him. The first stages must deal with observation; expression must come later. The elementary ideas of form should be gained by actual experience and study of objects, after which the simplest means of expression may be cultivated. First of all, then, the simplest type forms (sphere, cube and cylinder) are to be studied, and for this purpose solids, wholes not parts, should be used: They are to be studied not by sight alone, but by touch, by handling, and their nature brought out by questions and experiment until a true idea of the elementary properties of the forms is gained. From this as a basis the exercises may lead to the simplest forms of expression; first, of the idea of the whole, for that is the simplest. For this purpose clay, wax or putty may be used, but experience seems to point to clay as best suited to class room work. In this material, by working with the fingers and hands, the solids can be imitated and the impressions already gained, sharpened and corrected. Later, slips of paper cut into squares and other forms may be compared with the faces of the objects. These slips when folded symmetrically produce other forms, like faces of other solids and by this means an unconscious analysis of the form is made and a further idea gained of its properties. This folding across center lines may be carried much farther, and scissor- or knife-cuts made along the creases and the resulting pieces studied and arranged about centres as simple designs. Still handling the models the attention may be carried to the edges and after running the fingers over these and imitating the outlines in the air the first attempts at drawing may be made. It will be expression of the simplest kind, a record, as far as the child is able to make it, of the image formed in its own mind by the handling and study of the models and the endeavor should be to make this expression as free and genuine as possible.

In this first primary year, then, there has been an attempt to develop in the child's mind the elementary ideas of form by handling and experiment, and then to deepen and sharpen those impressions by reproducing the ideas in clay, paper and lines.

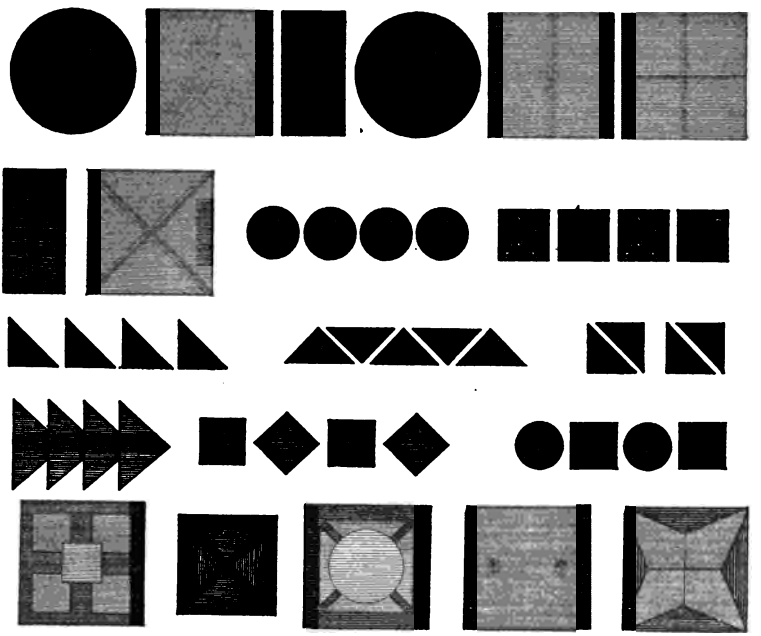

PLATE I.

This plate represents the character of the first year paper work. The pieces in the left hand upper corner showing forms in which paper is given, following which are simple folds and forms resulting from cuts along the folds.

The study and handling of the models should continue in the second primary year. Here a few other forms (cone, square pyramid, triangular prism, etc.) may be introduced and their making in clay carried out in the manner of the first year. Besides these type forms, examples of them in familiar objects, may be compared and made. In the paper work of this grade the practice in drawing may be made use of; lines on the squares of paper may take the place of folds. These lines at first would be much like the folds, following the diameters and diagonals; but afterwards, by the use of simple curves and freer lines, there would be secured at once a greater range of expression and an opportunity to carry the simple design arrangements much further. These design arrangements after being made from the paper folds and cuttings, may be drawn on manila paper. Besides the line work just spoken of, the drawing may deal with the faces and to some extent with the appearance of the models.

In the third primary year the remaining type forms may be added and their study continued. The clay work may here reach beyond the mere imitation of these forms to the modeling of natural forms and simple casts. The paper work will be freer from the use of curved lines, and the drawing, besides picturing the appearance of the different solids alone and combined, may take up the elementary ideas of the working drawing and the arrangement and relation of the different views of the simple solids.

The subject of color instruction is in too undeveloped a state to attempt to lay out a comprehensive scheme for it, but, as will be readily seen, in the arrangement of paper forms into designs an opportunity is offered, by employing differently colored papers, to bring out the relations of the colors and their proper values; but great care should be taken that the combinations always express unity and harmony and never display strong contrasts.

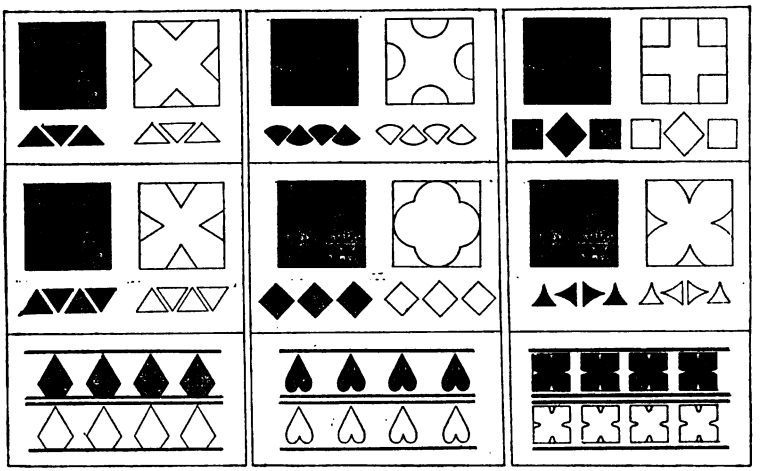

PLATE II.

In this plate are shown specimens of second and third primary year paper work, the drawing in each case accompanying the piece. The exercises given are simply indicative of the nature of the work and do not by any means represent its scope.

In the beginnings of the grammar school work, when the pupils have reached the average age of eleven years, the methods used may change somewhat in character. The handling of the solids in the manner of the primary years is left behind, the usefulness of clay modeling purely for purposes of geometric form-study is, in a great measure, outgrown and if used beyond this point it should be solely on artistic grounds. Paper folding and cutting in the flat no longer meet the pupil's needs, but another kind of paper work may here begin, the operations of which are of the utmost value. This is the making of geometrical forms out of thick paper or cardboard. Here, too, the use of simple instruments may well commence. In the primary grades, before the pupils' appreciation of accuracy has been sufficiently quickened to derive benefit from their use, instruments have not been employed. There the object sought is rather clearness of thought and freedom of execution, but now that some notions of the different forms and their properties have been obtained, the occupations may seek to express them with all the accuracy possible. The only instruments needed at first will be the rule, two small triangles, and later a very simple form of pencil compass. Although in all the work of the previous grades, in the handling of models, comparing of faces and folding of paper, the pupils have been studying the properties of form, which is simply pure geometry, they now approach the subject in its more exact relations. And here it seems as if the scope and power of these methods can hardly be over-estimated. The subject of geometry, the science of form, instead of being left to the higher schools as a dreaded logical study, is here learned in the doing and making. The cold statement of laws and propositions becomes invested with meaning and life when brought into the actual experience of the pupil, and when their expression in the material world about them is made clear. The elements of this kind of work have

been often used and are well suited to the needs of the first grammar year, but the possibilities have certainly not yet been reached, and the writer has little doubt that this occupation could be carried on with great value, not only as dictation work, but in the form of problems, throughout all the grammar grades. The exercises can be carried to almost any extent. After making the type forms singly, their combinations may be studied; as, for example, after a simple cylinder the intersection of two cylinders in an angle joint may be taken up, so touching on the principles of sheet metal work and the basis of many operations practiced in the arts.

The drawing which has now ceased to be merely an expression of simple form-study, must be carried on beyond this point as a special subject and will not be dealt with further in this paper, except to point out that whatever may be the nature of the work, representation, construction or decoration, it only attains its greatest value as the expression of an idea, and unless this idea is grasped by the pupil,—in other words, is his own idea,—the work is merely imitative and destitute of educational results.

This work of the first grammar year may, of course, be carried on in the regular class room, and this must be the character of the greater part if not of all the work attempted in the grammar grades. Separate laboratories, to accomodate the large numbers of the many grades, would be practically impossible in our large city schools. But besides this, there is another and still stronger reason why it is desirable to carry on this work in the regular class-room and under the direction of the regular teacher, as far as possible: it is that these exercises, to have their greatest value, must be followed as part of the regular school work, they must harmonize with all the other exercises and react upon them. This can be much better accomplished by the teacher, whose influence over the

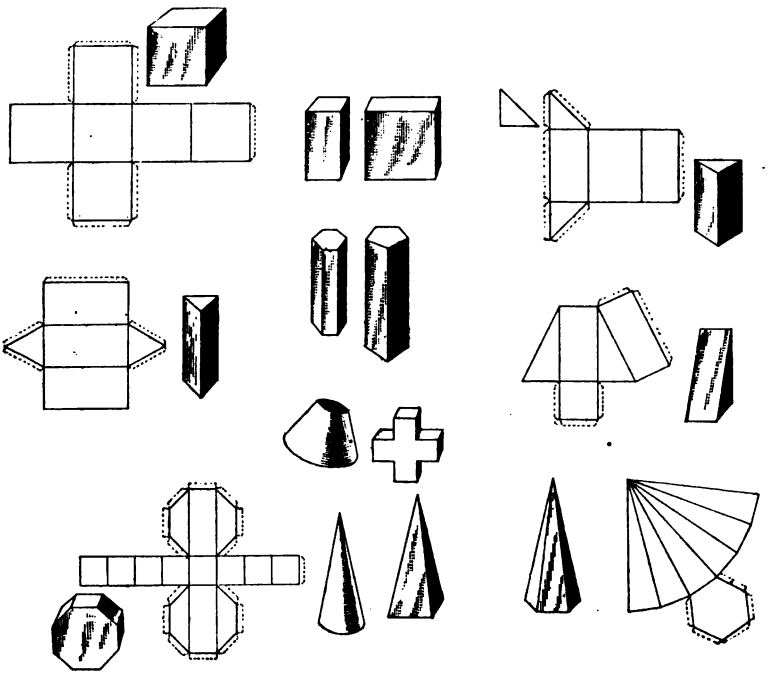

PLATE III.

This plate shows a few built up type forms with and without their patterns. The exercises possible are of course almost endless and applicable to very different grades of pupils.

class has been acquired by daily contact, than by separate instructors and among different surroundings. It would however undoubtedly be best to provide for the supervison of such work by competent experts, for some time to come.

It is in view of these facts that many experiments have lately been made towards developing a very simple kind of wood-work which can be done on boards placed on the regular school desks and which will lead on from the cardboard work of the first year of the grammar school and prepare for the joinery work of the later grades. In these experiments the thought has been that by employing very thin strips of wood which represent, practically, but two dimensions, simple combinations might be made and the first ideas of wood joints obtained without the difficulty of securing a fit throughout a considerable thickness. The tools needed in this work would be the same as in the cardboard work, with the addition of a small chisel or knife and hammer. The material can be obtained readily in strips and divided up for class use by running knife cuts across and breaking, so as to leave an irregular edge. Marking off and cutting with the chisel can then be performed on the lower part of the board, after which the pieces can be tacked in position and tested with the triangles on the upper part of the board. A certain portion of the pupil's work can be kept in this position for inspection and readily removed by lifting the pins.

Beyond this, in the third year, simple exercises with wood in the solid may be taken up and at this stage the Swedish Sloyd work offers many suggestions. It is hardly possible, nor is it desirable to use the exact exercises as employed in Sweden ;—many of the models have no significance in American eyes and are not adapted to American tools. The methods of instruction must also be modified considerably; class methods of instruction must be adopted, in place of individual teaching, and

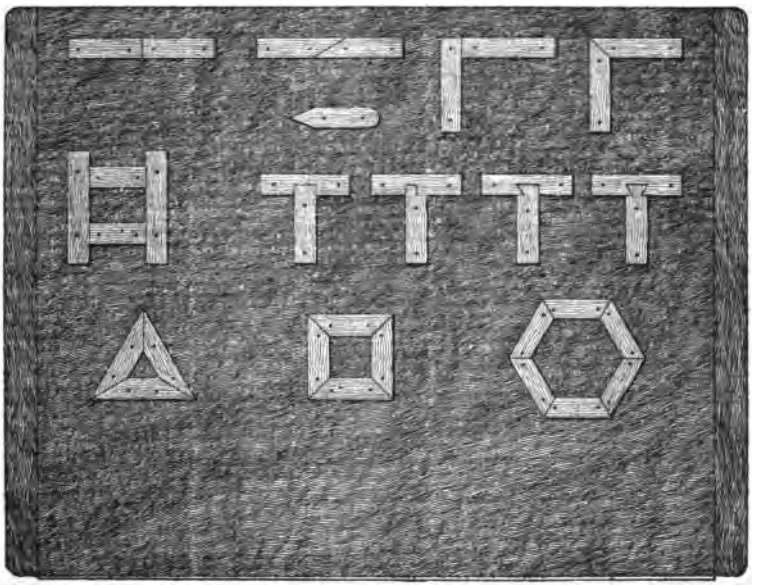

PLATE IV.

This cut gives some idea of the nature of the slip work. The pieces used are one inch wide and one-sixteenth or one-eighth inch thick. Basswood, whitewood and white pine are suitable woods, and the cutting may be performed by either a light and short paring chisel or a special knife with a straight slanting cutting edge at the end. The small strip at the bottom of the board is used to place the slip and triangle against when marking off.

the use of drawings and exact measurement introduced. It is not the copying of the exercises of Sloyd that will be helpful, but the study of some of its underlying principles, viz.: the simplicity of the first operations, the few tools required, the freehand character of the work and the economy of material—all of which tend to meet the necessities of the school room. These principles are admirably carried out in the earliest Sloyd work, and it is this work which offers the most fruitful suggestions for the solution of the present problem. The work which requires only the knife, chisel and laying-out tools, and leaves out the planes and saws can be carried on in the regular class room, by special teacher, perhaps, with but little cost for equipment. This matter is dwelt upon with emphasis because it is believed that any methods involving considerable cost of equipment and separate laboratories, however satisfactory in the results, do not meet, but distinctly avoid this public school problem of lower grade work.

There is one principle of Sloyd which is hardly consistent with the best results in class work, and that is the making of each exercise a completely finished article. Those articles which serve a useful end generally represent a repetition of a few operations and their construction involves a large amount of time without corresponding return. If a tool is to be used for the first time upon a constructive piece, there is very little chance of the work being satisfactorily finished in the first attempt, and the operation has to be repeated many times with much consequent waste before a successful issue is reached. It is here that the advantages of the Russian system, in which each exercise represents a single principle or method, are strongly apparent. By this system the practice necessary to the command of the tool is gained and the knowledge of methods acquired with the least consumption of time and material, before actual constructive work is taken up; and it is, without doubt, this principle

that must guide whatever is done in the higher grammar grades in the work that approaches the actual processes of the shop. But even here too much must not be attempted.

Although the principle is everywhere accepted and emphatically repeated that the school must not attempt special instruction, must not do trade work yet almost every attempt at introducing the work into the schools is greatly influenced by the conventional practice of the carpenter's trade. His tools are copied, generally in their full number and of their full size. But this is not necessary. This problem of school work should be met on its own conditions, not on the conditions of the carpenter's trade. Certain of the carpenter's tools, the planes and large saws, are awkward and difficult for boys under fourteen to handle. Others are easily handled and admirably suited to the needs of school work and with these tools everything desirable can be accomplished. With the chisel, back-saw, and laying-out tools, the whole field of joinery work can be covered. The saving in expense is also a very important item, as by leaving out the planes and large saws, the cost of tools for each boy is reduced one-half.

As has before been emphasized the nature of the work must be suited to the age and development of the pupils dealt with. When the manual training schools were first inaugurated the shop-courses imitated those of the engineering schools, but experience soon showed that the different conditions needed different means, and courses of work have since been developed, better fitted to their special needs. And now the work attempted in the grammar school grades runs a similar risk in copying too closely the work of the Manual Training School. But what is fit for the engineering school is not necessarily fit for the manual training school, and what is fit for the manual training school is not necessarily fit for the grammar school grades. Little can be done here in actual

construction, but much may be accomplished in exercises which, simple in themselves, develop in a high degree care and forethought and an appreciation of accuracy.

The work of the Manual Training High School, now so fairly developed, can here be only mentioned. In the system commonly adopted each year has its special work. In the first year the woodwork develops exact judgment and keenness of observation; the blacksmith work of the second year gives quickness and decision; and in the last year the metal work brings out strongly the appreciation of exact accurate work and gives a mastery of mechanical principles. Here the necessity for perfect comprehension of each thing dealt with holds as strongly as in the lower grade work, and acquires a wider meaning. Woods must be studied as to their nature and laws of growth, their distribution, preparation for market and commercial form. The action of tools must be analyzed and the underlying principles be clearly set forth; the metals must be treated in the same manner, their production explained and their strength and other properties studied. This analytical matter which is only now being properly developed, is an integral part of any course dealing with the operations of tools in wood and metal and any scheme which neglects it can achieve but partial and one-sided results.

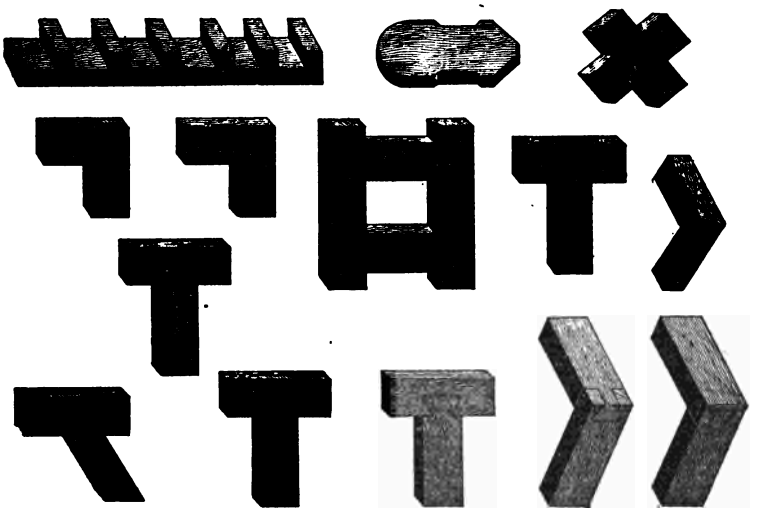

PLATE V.

The fourth year grammar work is shown here. The field of simple joinery being fairly covered without the necessity of the large saws or the planes.

APPENDIX.

The suggestions of this paper relating to the primary and grammar grades have been summarized in the following scheme :—

PRIMARY

- First Year—Handling and study of models, clay modeling, paper folding and drawing.
- Second Year—Handling and study of models, clay modeling, paper line work and folding, drawing.
- Third Year—Study of models, clay modeling of natural forms and simple casts, paper design, drawing.

GRAMMAR

- First Year—Making of geometric solids in paper, drawing.
- Second Year—Slip work in wood, drawing.
- Third Year—Exercises based on Sloyd, drawing.
- Fourth Year—Elements of joinery, drawing.

Manual Training as Introduced into the New York Public Schools.

Under the instruction of our Executive Committee, the special portion of this day's subject assigned to this paper is—"a discussion of the subject from the standpoint of the present curriculum, pointing out how the innovation may be made without undue sacrifice of anything of value that is now taught. Practical questions like those of time, ways and means, teaching-force, etc., should receive special treatment."

Permit me to begin by indicating as clearly as I can what we in the public schools of this city understand as included under the unfortunate title "Manual Training." I have no intention, however, of attempting the dangerous task of endeavoring to give a condensed definition. That some necessity for such a definition does exist, at least sufficient to justify me in thus consuming a portion of my allotted time, may be gathered from the fact that even in the prescribed divisions for our own Standing Committee work, we find an apparently implied distinction drawn between,—(1) Kindergarten, (2) Form-study and Drawing, (3) Usual School Work, and (4) Manual Training.

Now, first, we in the public schools of this city include, as a matter of course, under Manual Training, form-study and drawing; secondly, we agree perfectly with Dr. Woodward's statement in one of his many admirable addresses, that "The manual education which begins in the Kindergarten before the children are able to read a word should never cease;" thirdly, in all our school work, usual and unusual, we call that method best which proceeds upon the basis of the study of things, not words

merely. It is object-teaching applied to our methods of instruction in all those subjects of our curriculum to which the invention and ingenuity of the thoroughly trained and enthusiastic teacher can apply such methods,—the only limitation in the application being the extent of the teacher's inventive faculty. We regard Manual Training, not as a new subject,—an innovation to displace other older subjects, but as a system of methods and devices in teaching, which take into account the paramount importance of addressing the mind of the child through the avenues of all his sense-organs, laying particular stress upon the use, hitherto much neglected, of the sense of touch and the muscular sense. We regard the mere manual training, or training of the hand, as purely incidental, though immensely valuable.

Correct methods of teaching under this system must necessarily lead to facility in the use of the hand, but the mere facility is not aimed at as our ultimate object. Indeed when facility comes to such an extent, in any particular exercise, that the hand of the child begins to do the work so readily as to indicate that the best concentration of his thought is not demanded, we consider that the signal for an immediate change of exercise to the doing or making or handling, involved in some other tangible illustration, which will demand his full thought. We aim constantly at the production of thought-power in the child, with incidental hand-training, with incidental eye and ear training; in short, with incidental sense-training. Our own division of our committee-work, in this Association, would seem to give force to the statement that shop-work, or working in wood or metal, constitutes the sum and substance of manual training even in the minds of some of its best advocates.

Just here it is appropriate to say that in the present movement in our New York City Board of Education, which has for its object the extension of the introduction,

within a few months (probably in the early part of next year), of manual training methods into all the public schools of the city, both the Special Committee of Eight and the Standing Committee on Course of Study of that body, are substantially agreed on the omission of the workshop, or working in wood as a necessary factor,—leaving to future development its gradual introduction. They will thus avoid, and I think wisely, the misconstruction that seems inevitable in some minds, that trade-teaching, or mere training in the use of trade tools is intended. They thus avoid, as well, the heavy initial outlay specially involved in the plant of workshop and kitchen, and silence somewhat the usual outcry of those taxpayers who deem the cost of an improvement a proper objection to any progress looking towards the future welfare of the children. At the same time, under the plans proposed, the class teacher will be forced to prepare to do her work in all the subjects without the aid, while in presence of her class, of specialists.

In a paper limited in time to twenty or twenty-five minutes it would be impossible to discuss in detail all the changes in time, ways and means, teaching-force, etc., which have attended the introduction, since February 1, 1888, of Manual Training into about twenty-five departments of the school system of this City. A reading and comparison of the Teachers' Manual of 1884, which now governs the work in the great majority of our schools, and the Manual-Training Course of Study of 1888, which was compiled for the special use of the schools above alluded to, must be advised to those who desire full and accurate information. In this paper only a glance can be given towards some illustrations of the changes made and the ways and means adopted.

In the Primary departments (age of pupil from five to about 9½ years) :—

Development of conceptions of form through seeing objects, handling objects, clay-modeling, stick-laying, etc.

Representation of conceptions of objects by clay-modeling, paper folding, paper cutting and drawing.

Important memorandum:—"The child is not to be told what to see. He is told what to do with an object as a means of inducing him to discover some form or quality of it which ought to receive his careful attention; but he should never be told something to be memorized and recited about the object." With this general statement the detail follows, including:—

Study of the sphere, cube, cylinder, square prism, hemisphere, triangular prism, cone and vase-forms, and the surfaces, angles, lines, etc., involved. Handling the solids studied, modeling their forms and derived forms in clay, construction in paper, etc., etc., used in all this.

The outline of this primary work can be found in greater detail from page 15 to page 43 of the Manual of 1888, referred to above. The time allotted, in so far as a possible dissection as to time can be made (and it is only made here to meet the minds of those who contemplate "manual-training subjects" as separate and apart from "other" subjects in the curriculum), will be found to be about 300 minutes per week in each of the primary grades.

In the third primary grade (age of pupil from about 7 to 8 years) female pupils begin sewing, which is thence carried through all the remaining primary grades into and through the five lower grades (age of pupil from about 9½ to 12½ years) of the Female Grammar Departments, stopping where cooking begins.

Geography in the primary grades is begun in the highest grade (age of pupil from about 8 to 9½ years); modeling in clay or sand the natural forms of land (islands, etc.), with attendant drawing is constantly used as a means of teaching. In the opinion of the writer of this paper the study of the subject could be begun, granting proper methods of presentation, with the pupil's first entrance into school (age 5 years).

In all the grammar grades (age of pupil from about 9½ to 14+years) mechanical drawing is taught to both boys and girls. This includes a knowledge of the use of the ruler, triangles, square, compasses, scale, protractor, india-ink pens, etc.

Geometry in the six lower grammar grades (age of pupil from about 9½ to 12½ years) is taught by means of graphic solutions, with attendant proofs by superposition, to both boys and girls. In the highest grade plane geometry, taught by means of the logical method, supplements the former method. Throughout all the work the construction of all the regular solids in paper from single sheets, with drawings of methods of construction in "the flat," is relied upon as our (to the pupil as well as the teacher) most delightful stimulant to independent thought. All the prisms, all the pryamids and their frusta, prisms and pyramids, in the higher grades, being readily cut by the pupils at varying angles with the line of altitude, are made from single sheets of paper. No one who has not seen the every-day work can understand the wonderful invention evidenced by even the youngest pupils in this work and the intense delight they show in doing it. Woven throughout all the geometrical work is the practice of what has been aptly termed "inventional geometry."

Workshop practice is given in all of the five higher grammar grades for boys (age of pupil from about 10½ to 14+years), involving preparatory working-sketches and working-drawings to scale.

Cooking, or, rather, the physiology, hygiene, philosophy and chemistry underlying cookery, with their practical illustrations, is taught to the girls of the third and second grammar grades. Thus the sewing and cooking, taken together, balance, so to speak, the workshop practice of the five grammar grades for boys.

In all the grammar grades modeling and map-drawing

are continued as methods in geography and historical geography; and modeling as a means of form-study, for its help towards drawing and art-study, is constantly practiced.

Now, as to time:—

The minima in grammar grades are as follows:—

Language Lessons, 4½ hours per week;
Arithmetic, 1st to 5th grades, 2½ hours;
Arithmetic, 6th to 8th grades, 3 hours;
Penmanship (or its application), 2 hours;
Geography, 3rd to 5th grades, 1 hour;
Geography, 6th to 8th grades, 1½ hours;
Shopwork, 1st to 5th grades (boys), 2 hours;
Sewing, 4th to 8th grades (girls), 1 hour;
Cooking, 3rd to 2nd grades (girls), 1 hour.

The remaining time to be arranged at the discretion of the Principal. A slight examination of the margin allowed will show the great scope permitted as a relief from a machine Schedule.

I must again refer to the Manual of 1884. Some of the changes, besides those already indicated, made to meet the new work are:—

In the primary grades the amount of geography, principally political, previously taught has been materially reduced, and the text-book, for home-lesson purposes, eliminated.

In arithmetic, long division was cut out and sent to the grammar course. In the grammar grades in geography text-books (for memorizing home-lessons) were excluded from the lower grades (8th, 7th and 6th). History (5th to 2nd grades) is now taught by intelligently reading the subject in class, in constant connection with its incidental geography; the time for this "supplementary reading" being that formerly given to reading from a special "class reader." In the same way supplementary reading in geography and science is given where set class readers were formerly used.

A word remains to be said as to the way of managing the five workshop-grades, so as to give each boy two hours per week without trenching too much upon regular class work in other directions. Here the size of the room selected and the resulting number of work-benches came into play as important factors. My workshop, for instance, permits only 13 boys to receive instruction at one and the same time. In schools selected for manual training since February 1st, 1888, having more favorable conditions, I understand that the facilities are such as to accommodate a much greater number. It is evident that, in my school, all the work in these five grades, other than that done in the workshop, had to be so arranged as to suit multiples of 13;—a class of 39 pupils giving, for instance, three workshop-divisions, one of 52 pupils giving four workshop-divisions, etc., etc. This at first view, to those in the rut of the old methods of class-instruction for class-results, seemed to be a problem incapable of solution. What was the class teacher to do with those pupils remaining in her classroom in the absence of the workshop-division? Well, I can only say that we have found this apparent difficulty a blessing to the individual pupil. It has forced the class teacher to so study the individual necessities of her pupils as to best utilize their time as individuals. While the workshop-division is away, the weaknesses of the other pupils in varying directions are attended to. As a rule no uniform class-work is attempted during these separations. "Picking up loose threads" with individuals, as they may need special help, is what the teacher aims at. Some may be modeling, either for its application to geography or to form-study and drawing; others, in making preparatory sketches or working-drawings for their own workshop exercises; others, in finishing satisfactorily previously incomplete, or imperfectly accomplished, work in any direction that the teacher deems advisable. While

this condition of affairs demands from the teacher a deeper study of her pupils as individuals, and better and more rapid judgment,—what may by some teachers be called "harder work,"—yet we have found that these very features make what at first seemed a disagreeable necessity a boon to the children. Let me here say in justice to my own faithful teachers, that they, too, fully appreciate the return they obtain from willing pupils, and are fully repaid by the evidently real progress made in ability to think.

A few words need to be said as to extra working-force in the corps of teachers. My judgment is that, with the exception of the present apparent necessity for a specialist in the "Workshop" and "Kitchen," there is no necessity, in so far as the introduction of manual training anywhere in the system is concerned, for special teachers:—and with proper training in the future on the part of every class teacher, even these specialists may, in time, become unnecessary.

Before leaving this portion of my subject I deem it my duty to place upon record, in so far as I can with the opportunity now afforded me, my appreciation of the labors, not as yet fully and generally recognized, of one to whom more than to any one else belongs the credit of the new departure in the public schools of this City. During the year 1887, Mr. Thomas F. Harrison, then Assistant Superintendent of Schools, was assigned during four months, by action of the Board of Education, to the task of examining in many cities the development of this whole subject; and of formulating, after consultation with the full Board of Superintendents, headed by City Superintendent Jasper, a scheme for its wise introduction, without damaging shock to what was already good in our vast system, into our school work in this City. The Manual Training Course of Study of 1888, to which I have alluded, was the result,—and upon it has been built all that I have

described. After nearly a half-century of faithful work in this City, Mr. Harrison, on leaving the profession by his resignation of the position he had so long filled with honor to himself and profit to every teacher with whom he came officially in contact, could have left no more enduring monument of his foresight and genius than this work of inspiration. To him, more than to any other single individual, is to be attributed the fact that the new education has been grafted upon the public school work accomplished in this City with pupils ranging from five to fourteen years of age. And this is true at present, let it be remembered, only of the schools of the City of New York.

I should feel that I had not done justice to the subject in hand did I not, before closing this paper, devote some words to what I deem to be the solution of the problem of the proper introduction of Manual Training into all the Public Schools of this City. The efforts of all interested in bestowing upon the children of this City the great boon of the introduction of the new education should be bent persistently towards inducing the establishment, by the Board of Education, of a Saturday Normal School. If within a few months, as now seems most likely, these methods are to be introduced into all the schools, it is evident that over 3000 teachers will be, almost immediately, brought face to face with the necessity of obtaining, in some way, a knowledge of how to properly present them to children. These teachers, most of whom have either no conception or a false conception of what Manual Training means, must first be instructed themselves, or the inevitable result will be a miserable failure. The pressing and immediate necessity is the Saturday Normal School. To this school should be invited to serve as Professors the best specialists in the several directions involved, whether they be procurable in our own midst or from elsewhere. The only tests in the selection of these specialists should be their pre-eminent

ability, in the light of the new departure, first, to clearly present the pedagogic principles underlying the teaching of their respective specialties; secondly, to illustrate correct methods of presentation to the children, in the day-by-day sequence of the prescribed work in the several grades; and, thirdly, the further ability to present to the teachers correct devices tested by experience or comformable to methods based on approved pedagogic principles. Let such experts be welcomed, coming from no matter where, let them strive to vividly impress their spirit upon our teachers, and thus indirectly upon the future welfare of the children; and finally, let the only test of their professorial continuance in such an institution be the survival of the fittest. Any principal of a Manual Training School who has, during the past year, been endeavoring to "spread the light" among hundreds of inquiring visitors, will bear me out in stating that an almost dense ignorance of the subject characterizes even the professional teachers among these visitors, and that very few could digest what they saw and heard. When teachers will, on entering, begin by informing you "that they have only fifteen minutes to afford to the examination of the subject, and would like to see your Manual Training as quickly as possible," it is easy to understand how ineffectual have been the efforts of those who have written volumes for the instruction of professional brothers and sisters. Mr. H. H. Boyesen, in a recent article upon a totally different subject written for the *Forum*, tells a story of his experience in this country, which is so apropos that I may be pardoned for reproducing it here. He writes that, once having had the honor of waltzing with "an aspiring young lady," and "while they were whirling in the dizzy mazes," she said to him, "Now, won't you be kind enough to give me just in a few words the gist of Spinoza's 'Ethics?'" One would almost imagine that the anxious, but hurried, inquirer into the subject of Manual Training expected to see something

like a "dime museum freak" trotted out from its cage on call. With such, patience ceases to be a virtue.

In proposing the establishment of a Saturday Normal School I am voicing the sentiments and desires of the great majority of the teachers in this City, who are only too anxious to do intelligently and well all that may be demanded of them, but who need light upon this subject. And, that I may not be misunderstood, let me say that the establishment of a permanent Normal School, such as I advocate, does not, in the slightest way, involve an arraignment of any college or school devoted to the preparation of persons desirous of entering upon the profession of teaching. I am advocating the continuous professional training of those now actually teaching ;—in my opinion, a necessary supplement to the very valuable previous work, mainly theoretical, done in such colleges. I am advocating a Post-Graduate Normal School for the benefit of those who feel the necessity, while handling classes and while, if they be faithful, studying closely the workings of the child-mind, of coming for consultation, advice and inspiration, at least once a week, to experts in the many directions covered by our curriculum.

Theoretical training before entering the profession, and the further, deeper and more difficult and serious study, after having become responsible for the future well-being of human lives and souls, are two totally distinct things. We need both in the City of New York, that it may keep its place in the van of progressive teaching. I believe we have in the public schools of this City,—no matter what may be flippantly said of exceptions to the rule,—a body of the most faithful, intelligent and painstaking teachers to be found anywhere on this continent. Give them the opportunity I advocate, and they will rise to the demands of the new education so gladly and so enthusiastically as to satisfy the highest known standards of professional excellence.

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IN THE

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BY

JAMES MacALISTER, LL.B.

Superintendent of Schools

MARCH, 1890

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PREFATORY NOTE.

The following pages contain a comprehensive account of the scope and character of the manual training at present given in the Philadelphia public schools. The question of manual training has of late years been attracting a great deal of attention in every part of this country, and it has been thought that a statement of what has been accomplished in a large public school system might be of general interest. It is now about five years since the introduction of the various features of manual training was begun in the Philadelphia schools, and the experience gained ought to prove of some value to other communities who are interested in the movement. It will be understood that the systematic development of the training through the various grades of the curriculum has not yet been accomplished. Different phases of the work herein described have been added step by step, and it yet remains to connect the kindergarten with the manual training school by the elaboration of a series of manual exercises which will supplement the existing course of study at every point and thereby render the training of the pupils more symmetrical and complete as a whole. The Appendix contains detailed statements of the courses of instruction in several of the departments, so far as these have been systematized.

JAMES MACALISTER.

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Manual Training in the Philadelphia Public Schools.

THE GENERAL QUESTION OF MANUAL TRAINING.

No one having the slightest interest in education can have failed to notice the attention which the question of manual training has been exciting during the past few years. Indeed, it may be said without exaggeration to be the leading educational question of the day. In teachers' conventions, boards of education, educational journals and the daily papers, it is now more discussed than any other school problem. The necessity for some modification in the instruction and training given in the public schools that shall bring them more into harmony with existing social conditions is very generally admitted, and it is useless to deny that this demand points in the direction of rendering the schools more practical in the highest and best sense of that term. It may justly be said that this new feature of education has been more heartily welcomed, and that more has been done in putting it into practical operation in Philadelphia than in any other city of this country. A good deal has been said and written on the subject here; but in view of the experience we have gone through and the fact that no small degree of misconception still exists with respect to what manual training means and what it undertakes to do, it has been deemed advisable to restate the leading principles upon which it rests its claims as one of the most important and far-reaching educational reforms of the present century.

Much of the confusion which exists in the public mind concerning the movement is due, I believe, to the want of

a term which would adequately designate the nature and object of the training it is proposed to introduce into the school curriculum. The use of the term "industrial" is, I think, unfortunate. It has a well-accepted meaning, and very naturally leads to the supposition that what is intended is the teaching of specific occupations. The term "manual training" is to be preferred, but that also is to some extent misleading. Speaking for myself, I must repudiate any intention of specializing the work of the elementary schools in the direction of economic production. The object of the public school is education in its broadest sense. If industrial or manual training cannot be shown to be education in this sense, it has no place in the public school. We have no more right to teach carpentry or blacksmithing than we have to teach law or medicine. The supreme end of education is the harmonious development of all the powers of a human being. Whatever ministers to this end is education; whatever interferes with its accomplishment, no matter how valuable in itself, belongs outside of the elementary school.

It is well, also, that we should be on our guard against a kind of *pseudo* manual training that is finding its way into the schools. As is always the case with new movements, there is a good deal of experimenting with little knacks, which do nothing for either discipline or knowledge. These are put forward by well-meaning persons as manual training, and great harm is done in this way in misleading the public and wasting the time and energies of pupils.

Manual training is founded upon the claim that it gives a more complete education than is afforded by the course of instruction now followed in the schools. It undertakes so to modify the existing methods of training as to yield an education that shall make the graduate of the public school a more fully developed and efficient member of society. The instruction given in the schools is too one-

sided. It cultivates chiefly the intellectual powers to the neglect of the physical and moral. Lord Bacon, long ago, stated the object of education to be "the cultivation of a just and legitimate familiarity betwixt the mind and things." No better definition of the office of the teacher could be given. To a very large extent the schools neglect the training of those powers which bring the mind into true relations with its environment. A very large portion of the time of pupils in schools of every grade is devoted to the study of words. Educational reformers for nearly three hundred years have been seeking to remedy this defect. The introduction of object lessons and of science instruction were well-meant efforts in this direction, and manual training is, in fact, nothing more than the further extension of the same principle. It seeks to train the hand and the eye, not for the purpose of superseding the action of the mind, but as the efficient agents of the mind in gaining a truer and ampler knowledge of the world. That dominion over nature which the inductive philosophy proclaimed as the object of all science can only be obtained on the lines which Bacon laid down. Emerson says in his terse way that "manual labor is the study of the external world." It is in the spirit of this maxim that the new education seeks to widen the training of children in the direction of the harmonious development of mind and body through such agencies as the best experience may dictate.

There is a psychological foundation for manual training which should not be overlooked. All educationists are now of one mind that the first duty of the teacher is the cultivation of the perceptive powers. No matter what system of philosophy we may profess, we are all agreed that knowledge begins in perception. The tactual and visual perceptions are by far the most important. "The former of these gives us the most direct mode of apprehending things; the latter the largest grasp of external

things, of any of the modes of perception."[1] The progress of perception grows with the increase of the power of visual and tactual discrimination. Now the purpose of manual education is primarily the training of the hand and eye. Hence drawing, as a mode of cultivating visual perception, is made one of its prominent features; and the introduction of tools in connection with wood, iron and other materials is simply for the purpose of so cultivating the hand as to enable the mind to attain to a larger and more exact knowledge of things as they exist in nature and are used in the industrial arts. It would therefore be easy to show that the introduction of manual work into the schools is important because of the effect it would have upon the mind itself. The processes of manual training afford a better means of cultivating the faculties of reason and judgment than many things which now find place in the courses of instruction. Measurements, comparisons, the adjustment of means to ends, the co-operation of mind, hand and eye, all conduce to a broader mental culture than can be gotten from many of the studies which at present usurp so large a portion of the pupils' time.

We do not need to depend wholly upon theory for the correctness of this view of manual training. Experience has shown that manual training so stimulates the general intelligence of pupils that the time occupied in the laboratories or work-shops more than compensates for the amount of text-book work which it supplants. It would be easy to find ample testimony to this effect. The schools of a generation ago were certainly inferior to the schools of to-day as to teaching, text-books and other appliances; but no one will gainsay the statement that they produced men and women possessing a mental and moral force of character quite equal to those of our own time. Is not this largely to be accounted for by the fact that, while the advantages were poorer and less time was

[1] Sully.—*Outlines of Psychology.*

spent in school, the boys and girls, in the rural life which then chiefly prevailed, were brought more largely into contact with things through work upon the farm and in the home, and their mental resources were thereby increased to a degree that the purely intellectual drill and the memorizing processes of the present day cannot be made to yield? The introduction of sewing into the girls' schools of Philadelphia, which occupies from one to two hours per week, has in no way impaired the results obtained in the other studies. In the Manual Training School, the work done by the boys in mathemetics, literature and history is, to say the least, in no respect inferior to that of schools of a similar grade in which the whole time is occupied with class-room work.

But there are more practical reasons for making manual training a part of the education given in the public schools. Its introduction would bring our education into closer harmony with the spirit and tendencies of the present age. No one will deny that it is the duty of the state to make the schools minister to the actual necessities of our civilization. Herbert Spencer declares that "the function which education has to discharge is to prepare us for complete living," a proposition which has withstood no small amount of adverse criticism; and Emerson, in one of his wise sentences, says that "the great object of education should be commensurate with the object of life." If we acted in the spirit of these maxims, we should hear less of the objection so often urged, that the education given in the schools is not sufficiently practical. I would not be understood as arguing for practical education simply as such. At the same time, I believe that the education of a community should have direct reference to its social needs. This is eminently the age of industrialism. Science and its applications to the arts and industries of life reigns supreme. The wealth, power and greatness of a nation depend to a very large extent upon its natural

resources and the quality and quantity of its skilled labor. As Carlyle says, "The proper Epic of this world is not now 'Arms and the Man;' no, it is now 'Tools and the Man;' that, henceforth, to all time, is now our Epic." It is impossible for the schools to ignore this condition of things. It is not our business to train boys and girls to be mere breadwinners, but we must see to it that the education we give to them confers the power to hold their own in the struggle of life upon which they must sooner or later enter. I have no sympathy with those who claim that the public school gives too much education to the masses of the people. It is impossible to over-educate any human being. The only question is as to the kind of education which should be furnished. We must train our boys to believe in work; to respect work; to seek work. This should be a part of their education; and the way to do it is not to teach them trades in the public schools, but to broaden the general culture which those schools give in such ways that the young people shall begin their career in sympathy with the social conditions which surround them; will seek for success, independence, happiness, by striving, not against, but with the forces which compel success and its rewards.

It is my sincere conviction that the best means of doing this is to put manual training into the curriculum of the common schools. As at present constituted, the schools are directed almost wholly toward a literary outcome. The traditions of the past are still all-powerful in the common school as well as in the college. We need to make our education more real. In doing this, we shall not make it less noble and refining, but we shall give to the children a wider vision and a braver heart, and we shall send them forth into the world better able to deal with the realities of life and to discharge its duties fitly and successfully.

There is another aspect in which the introduction of

manual training may be viewed. The great question of the hour is the struggle between labor and wealth. This question cannot be put out of sight. We are gradually coming to see that one of the best ways to meet the difficulties which it raises is to elevate the worker himself. What the working-man is seeking is a larger participation in the fruits of his industry; but this can only be accomplished by the laborer putting more skill and intelligence into the work of his hands. The problem for every civilized nation to-day is how the largest amount of intellectual development can be given to its industrial population. There will be no peace between labor and capital until labor has recognized the necessity for intelligence, and capital has recognized the just rights of labor, enlightened and ennobled by knowledge. What is needed is to bring thought and labor together; to make every worker a thinker and every thinker a worker; and there is no place where this can be done so well as in the school. It is here that enduring principles and habits can best be formed. We talk a good deal of the public schools as the nurseries of good citizenship. We shall have a better right to make this claim for them when they undertake to fit their pupils for the actual conditions of existence; for the world as they will find it—a world in which it is a privilege as well as a necessity to work; and in which work, animated and directed by the power which comes from a well-trained mind, cannot fail of its just appreciation and reward.

There are many other advantages which would accrue from the introduction of manual training into the public schools, but to which only the briefest allusion can be made in this place. Not the least of these advantages would be the larger degree of confidence and support which the schools would receive from the general public. It is useless for us to conceal the growing dissatisfaction with many of the features of the public school system.

Some of these objections are no doubt ill-founded; but there are others to which no valid answer can be made. What the people want is schools more in accordance with the real needs of society and the principles which the advance of scientific methods of instruction demands. Nearly every city experiences difficulty in getting the appropriations which are necessary to keep pace with the growth of population and the improvement of the schools. I believe a larger degree of sympathy and support for the public schools would be obtained, if we could only make up our minds to set aside the antiquated and useless work that is required of pupils, and substitute in place of it more rational methods of development and training. I have no doubt also that the period of school attendance would be considerably prolonged by such a course. The lament in every large city is that the mass of the children spend so little time in the schools. The tens of thousands are in the primary grades; the few thousands in the upper grades and high schools. The people, I think, would be quick to discover the advantages of giving their children more education, if this education could be made better in quality, which is equivalent to saying more available for the practical uses of life. I am convinced that the introduction of manual education would do more to rid the schools of tasks upon which the time of the pupils now runs to waste than anything we could do for them. The eight years of the common school course should certainly yield better results than are now obtained. A great deal that we persist in regarding as absolutely essential will sooner or later have to be discarded, and the modification of the course of instruction, in accordance with the general principles here indicated, will, I am sure, tend to hasten the coming of this better day.

MANUAL TRAINING DEPARTMENTS.

The efforts which have been made to apply the principles outlined above in the Philadelphia public schools during the past five years, have created so much interest that it seems desirable to recite briefly how far and in what directions the work of organizing the instruction and training has proceeded.

The manual training now given is embraced in the following departments:—

1. Manual Training School.
2. Industrial Art School.
3. Sewing in Girls' Schools.
4. Cookery in Girls' Schools.
5. The Kindergartens.

To these might be added Clay Modeling and Paper Folding and Cutting which have been gradually finding their way into the primary schools; but as these branches have not yet been systematically developed they cannot be regarded as an established part of the regular course of instruction.

I. MANUAL TRAINING SCHOOL.

The Manual Training School provides a three years' course of instruction in some respects parallel with that given in the High School. It is less extended in the departments of language, literature and mathematics, so as to make room for the courses in manual training and drawing which are its special features. Boys are admitted after having finished the grammar school course on precisely the same standard as is prescribed for admission to the High School. The first class was graduated in 1888. The instruction embraces the following courses:—

1. *Language and Literature.*
2. *Science.*
3. *Mathematics.*

4. Drawing.
5. Manual Training.

As the best means of indicating the scope and character of the manual training, the outline of this course has been given in the appendix, and also the course in drawing, taken from the circular of the school. While these two courses are the distinctive features of the school, it must be borne in mind that the others are not neglected. On account of its novelty the manual training is apt to make the strongest impression upon visitors, and they do not always discover that the literary and scientific training are just as fully recognized and provided for. Anything like a one-sided culture is carefully avoided, the aim of the school being to give to each branch, whether scholastic or manual, such relative importance as shall lead to a fuller and more symmetrical development of mind and body than has been possible under the old systems of secondary education.

The success which has attended the Manual Training School from the first is the best guarantee of the soundness of the principles upon which it is organized and conducted. Beginning a little more than four years ago, in a very humble way, it has steadily grown in public confidence and approval. It has more than justified every claim that was made in its behalf. Every available foot of space is now occupied, and it has now become impossible to admit all the pupils who apply for admission. The Board of Education has therefore been brought face to face with the question whether the time has not come for opening another manual training school in such a quarter of the city as may be deemed most advantageous to the public interests. The original intention of the Board was to establish four or five of these schools as fast as a just regard for the other departments of the school system would permit, and the growing demand for the kind of

education which this school represents will render the fulfillment of this purpose a necessity at no very remote date.

II. INDUSTRIAL ART SCHOOL.

It was in this school that the attempt to introduce manual training into the public schools of this city was first made. The term is here used in its most general sense, and not with the special meaning which now attaches to it. This attempt was made by Mr. Charles G. Leland, the well-known *litterateur*, who devoted himself to the experiment with all the vigor and enthusiasm so characteristic of his nature. It was a labor of love with him, and he spent several years in the work without other reward than the success which attended his efforts to promote an interest in the educational movement which he so ably represented. The school attracted much attention, and its influence was widely felt through the magazine articles and other publications in which Mr. Leland so attractively set forth the principles on which it was founded, and the objects it was intended to accomplish. After Mr. Leland severed his connection with the school, it was re-organized by the Board of Education and brought into more intimate and regular relations with the general school system. The school is open to boys and girls who come from the various grammar schools of the city. The pupils attend two hours per week, permission being granted for this purpose, on the request of their parents, by the principals of the schools to which they belong. There are now about seven hundred boys and girls, from ten to fifteen years of age, on the roll. This is but a small proportion of the whole number of grammar school pupils; but the Industrial Art School has served the important purpose of keeping up an active interest in manual training, and furnishing a practical demonstration of its value, till such time as an elementary scheme can be worked out

and put into operation throughout the city. The revised course of instruction and training, which extends through two years, will be found in the appendix.

III. SEWING.

Sewing was made a part of the regular instruction in the girls' schools in 1885. The success which had attended its introduction into the Girls' Normal School, several years prior, opened the way for this important step. At first a few teachers were employed, as an experiment, in schools situated in different parts of the city; but a few months subsequently, the Board of Education felt warranted in extending the instruction into all the girls' secondary and grammar schools. As now organized, the girls take up the sewing at the beginning of their third year of school, and keep on through the succeeding grades of the local schools, and the Normal School if they should go there. At present about thirty-five thousand girls receive regular and systematic instruction in the use of the needle. The instruction is limited to plain sewing, because it has been found that this yields better training as well as more practical results than the fancy-work which is sometimes taught. All the instruction is given by special teachers of whom there are now forty-four in the employment of the Board. The question is often asked whether the instruction could not be entrusted to the regular class-teachers. There is no abstract reason why an exception should be made of a branch so intimately connected with the pursuits of women; but experience has shown that it is safer to intrust a new feature of school work so radical as this to specialists. The regular teacher has already so much responsibility that she is loath to undertake a new study, with the methods and management of which she is wholly unacquainted. Wherever sewing forms a feature of school instruction upon a large scale, special teachers

have been found a necessity to ensure satisfactory results. Future experience may lead to a different conclusion ; but I am strongly convinced that at present the wise course is to depend upon teachers whose attention is concentrated upon this one branch, and who can be held to a strict responsibility for the work.

The place which the sewing now holds in the schools has not been reached without considerable discussion and opposition. But all this has passed away, and the public have accepted the results as demonstrating the value and importance of the training which it gives. The testimony of the principals of the Girls' Grammar Schools has been unanimous as to the beneficial influence of the sewing lessons upon the pupils. They break up the monotony of the school ; they afford a pleasant relief from the pressure of the purely intellectual studies ; they cultivate respect for the work of the hands ; they train to habits of neatness and order in practical affairs, and they confer an accomplishment which every girl will learn to value in after life. One needs to know something of the methods of instruction pursued in the sewing class to feel warranted in making such statements ; but the many thousands who witnessed the exhibition of the classes at work, and the extensive display of articles which the girls had produced, last spring, were surprised to discover how much valuable educational training can be gotten from so familiar an art, when its processes are systematically developed by a skillful teacher.

The sewing lesson is a good example of the dignity which can be given to any form of manual work upon which intelligence is brought to bear, and it points the way to methods of training that will help to bring the school into closer relations with the home, and thereby raise the general level of human culture among the masses of the people.

A synopsis of the scheme of instruction and training in sewing is given in the appendix.

IV. COOKERY CLASSES.

The introduction of cookery as a branch of instruction in the public schools is based upon reasons precisely similar to those which may be urged in behalf of sewing. These have been already presented in a general way, but inasmuch as the cookery has not been so fully discussed and is still regarded as an experiment, it seems proper that the grounds upon which it rests should be more explicitly stated.

1. While much may by said in behalf of the intrinsic advantages of cookery as an element in the schooling of girls, it seems to me to belong to the larger problem as to what should be the scope and purpose of a scheme of education intended for the masses of the people. If the view which has obtained among the most eminent thinkers on education for nearly three hundred years be accepted, viz.: that it must have reference to life in its broadest relations, it would be easy to show why an art which is so intimately connected with social well-being should find a place in the school. Political philosophers have demonstrated the important bearing which a sufficient supply of wholesome food has upon the physical, moral and economic conditions of a community; yet it is a well known fact that ignorance and wastefulness in the preparation of food prevail extensively among our people. The wide-spread interest in domestic as well as public hygiene which has been growing up of late years has borne good fruit in many directions; but nowhere has it proved more beneficial than in calling attention to the importance of cookery as one of the most important economies of right living. Indeed, so fully has this conviction taken hold of the minds of intelligent people, that no careful mother now considers her daughter's education completed without a course in one of the special schools for teaching this branch, which are to be found in every city. But these

private establishments reach only a limited number of the girls who are by and by to have the care or direction of households. It is therefore pertinent to ask whether a branch of knowledge and training which has so many valuable and useful features should not be recognized in the schools which are maintained for the benefit of all. This question is now receiving serious consideration in nearly every part of the country and it has already been affirmatively answered in a good many places.

2. But there is a second aspect in which the teaching of cookery may be regarded. In the multiplicity of agencies that are being pressed into service for the betterment of society, we are beginning to revert to the home as the chief center of the noblest as well as the most practical influences that go to the building up of all that is best in human life. With us, as with all the members of that branch of the Aryan family to which we belong, the home is the sacred place where every virtue has its birth and every social duty finds its strongest nurture. Hence the desire which educationists who take the right view of their responsibilities have always felt to connect the school with the family, the teacher with the parent. Any view of education which loses sight of this purpose must of necessity be partial and fail to recognize some of the forces which are most potent in the development and training of a human being. It is because the cookery lessons, like the sewing lessons, bring the school and the home into line with each other in some of the most real and practical affairs of life that they are finding favor with educational authorities. The public schools cannot much longer confine themselves to scholastic training. They must open the way to those kinds of knowledge and skill, and they must strive to form those habits, that tend to dignify every relation and occupation of life. The duties that appertain to home must be numbered among the most important acquirements of a girl's education; and the school which

undertakes its share of responsibility in supplying them is not departing from its proper sphere, but is fulfilling one of the chief functions that give it a right to exist. Surely no school can be regarded as pursuing unworthy ends in training girls to do with intelligence and pleasure the things that are too often looked upon as involving only degradation and drudgery.

3. A good deal might be said in favor of the purely educational value of the cookery classes. The instruction necessarily involves a good deal of scientific knowledge. The chemical composition and physiological effects of food are considered in connection with its preparation, and the information derived in this way is often of more value than if obtained from the study of the same principles as they are generally taught in the school-room. The instruction partakes largely of the nature of object-teaching in its best form, and is calculated to leave a much stronger impression upon the mind than can be made by a mere statement of scientific facts or even by such experiments as are possible in the class-room of a grammar school.

The introduction of cookery into the public schools is due to the Public Education Society, an organization which has rendered valuable service in promoting many desirable educational reforms in this city. A proposition was made by this association in 1887 to pay all the expense incident to conducting an experimental class in the Girls' Normal School. After careful consideration the offer was accepted and work was begun in September of that year. The experiment was carefully watched, and by the close of the June term, the Board of Education became satisfied, not only of the value of the instruction and training received by the young ladies, but the practicability of making it a regular branch of the curriculum. Arrangements looking to this end were effected by the Board's assuming the entire financial responsibility of the

instruction, and every young lady who now graduates from the school receives a course of lessons in the theory and practice of cookery. In the summer of 1888 the same society came forward again and offered to do for the Girls' Grammar Schools what had proved so successful in the Normal School. The Board accepted this liberal tender, and a number of classes—amounting altogether to about seven hundred pupils—were organized and started in October, 1888. The demand for admission was so urgent that twice that number could doubtless have been enrolled if the accommodations and resources at command had permitted. In the autumn of 1889 a second center for Grammar School pupils was opened. Here is evidence enough that the public appreciates and is ready to avail itself of this branch of instruction. In spite of the fact that the girls have to sacrifice two hours per week of school time for these lessons, the classes have been well attended, and the practicability of organizing and carrying forward a system of instruction that would include all the girls of proper age in the grammar schools of the city has been clearly established. The girls have taken great interest in the work and its value is thoroughly appreciated alike by them and their parents. At present the course laid out for the classes includes twenty lessons. It is a question, however, whether it would not be advisable to extend the number of lessons to twenty-five, so that more time could be given to the scientific features of the instruction; but this is a matter of detail which can be settled by a larger experience. From what has been said it is apparent that the problem of giving instruction in cookery in the schools has been fully solved. With respect to the grammar school classes the experiment may be regarded as entirely satisfactory, and all that is needed to make provision for the instruction of all the girls of proper age in this department of the school system is the opening of a sufficient number of school-kitchens in

such localities as will be conveniently accessible to the largest number of pupils. If the necessary appropriation can be secured, the Board can, by another year, put the cookery instruction upon the same footing as the sewing; and bring within the reach of every girl who remains a sufficient length of time in the schools a valuable accomplishment which, while enlarging her knowledge, will render her more efficient in every relation of life that she may be called upon to assume.

V. THE KINDERGARTENS.

No explanation is needed for treating the kindergartens as a department of manual training. The philosophy of their founder, Friedrich Froebel, furnishes the best exposition of the principles upon which manual training rests, and the methods pursued in the kindergarten afford the best illustration of the application of these principles to the training of children.

The kindergartens owe their origin to the Sub-Primary School Society. Philadelphia has been peculiarly fortunate in the possession of associations formed to co-operate with the Board of Education in promoting improvements in the public schools. Seventy years ago the foundations of the public school system were laid by a body of distinguished citizens who had associated themselves for this purpose. The Public Education Society, to which reference has already been made, has been influential in cultivating public sentiment when needed in behalf of movements set on foot by the Board of Education, besides furnishing such tangible help as defraying the expenses of the experimental classes in cookery and the Exhibition of Industrial School Work hereafter to be described. The Sub-Primary School Society was organized for the express purpose of establishing the kindergartens. A few ladies and gentlemen, feeling the need of doing something for

the education of a class of young children which the public schools did not reach, came together in 1879, and commenced the work in a quiet, unostentatious way. A kindergarten was started in the public school at Twenty-second and Locust streets, six persons subscribing $100 each to defray the expenses. Other kindergartens were opened, and the movement progressed to such an extent that in 1881, the Sub-Primary School Society was incorporated to care for the growing enterprise. Under its management the work grew so rapidly that in 1883 an appeal was made to the City Councils, which resulted in an appropriation of $5,000 for the maintenance of free kindergartens. In 1885 the appropriation was increased to $7,500; the Sub-Primary School Society meanwhile raising by voluntary subscriptions a sum almost equal to that granted by the city. These appropriations were expended under the direction of the Board of Education, which thus came to stand as a sort of foster-father to the kindergartens. It was but one step farther to the adoption of the kindergartens by the Board. In 1886 the Councils added the sum of $15,000 to the school budget for the support of kindergartens, and on the first day of January, 1887, they passed from the control of the Sub-Primary School Society to the Board of Education and became an integral part of the educational system of the city. The formal transfer was made at a public meeting held in the hall of the College of Physicians, January 20, 1887, at which the Hon. Robert N. Willson, Judge of the Court of Common Pleas, presided, and President Edward T. Steel accepted the kindergartens on behalf of the Board of Education.

In some remarks which the writer of this paper had the honor to offer at this meeting, an attempt was made to indicate the extent of the responsibility which the city was assuming, to state the nature and purpose of the kindergarten as a means of child education, and to point out the

place which it might be expected to fill in the general school system. I have found no occasion to change the views expressed at that time, and prefer, therefore, to give the substance of these remarks rather than to reproduce what was then said in another form.

The Place of the Kindergarten in the Public School System.

I feel that it is unnecessary to add a single word of congratulation upon the event which has brought us together this afternoon. The Sub-Primary School Society has done its work so well, the Board of Public Education has shown so hospitable a feeling towards the child whose foster-father it is about to become, the City Councils have so generously attested their interest in the movement, and the public sentiment is so well represented by this large and intelligent audience, that it would be superfluous for me to say anything tending to increase the general satisfaction and joy which have characterized the proceedings.

I may be permitted, however, to emphasize the importance of this gathering in its relation to the public school system of the city. It must prove a source of great encouragement to those directly concerned in the management of the schools and an augury of better things to come, to see so large a number of citizens assembled to celebrate an incident purely educational in character. It must be taken as an evidence of the increasing interest of the public in matters which, although of vital importance, are apt to be neglected in the multitude of duties which occupy so much of the time and energy of the men and women of a great city; but it cannot be too constantly borne in mind that schools cannot grow and prosper without the active sympathy and support to be derived from the intelligence and morality of the community whose highest welfare they are intended to promote. This meeting, I am sure, cannot fail to create in the minds of

teachers, school-officers and all who are in any way connected with the public education of Philadelphia, a realizing sense of the fact that our people are deeply interested in their schools, and are willing and anxious to do anything which promises to extend their influence or improve their quality.

It needs no prophet to say that this day will be a memorable one in the annals of the public school system of Philadelphia. A step has been taken which, if not checked by some untoward influence, will have far-reaching and beneficent effects upon the social well-being of the community. A great deal depends upon the character of the education which our children receive. The prosperity and happiness of this city stand more directly related to the public schools it maintains than to any other institution in its midst. The incorporation of the kindergarten into the public school system is an event of more consequence than may at first sight appear. It means really a new departure in the entire system, and the future of the schools will depend very largely upon the success or failure of the movement which has been so auspiciously inaugurated.

And this leads me to remark that there are serious questions involved in the transfer of the kindergartens from the Sub-Primary School Society to the Board of Public Education which must not be passed over while indulging in the felicitations appropriate to this occasion. In receiving the kindergertens, the Board of Education has assumed duties and responsibilities which will tax its intelligence and patience in new directions, and call for important changes in the general administration of the schools. Among the questions which will come up will be the extension of the school system very considerably beyond its present limits. The kindergarten means a large increase in the number of children entitled to the privileges of the public schools. You must not estimate

the number of children who will have to be taken care of, by the few hundreds who have been in attendance upon the kindergartens while under the management of the Sub-Primary School Society. The moment you make the kindergarten a public institution, you open the door to the thousands of little ones between the ages of four and six who help to swell the population of the city. The kindergarten is certain to become popular. It will not take the fathers and mothers of the city long to find out the advantages of schools by which the mental and moral training of their children can be begun two years sooner than at present; and if the kindergartens are to do their best and most useful work, the Board of Education will have to plant them thickly within easy reach of the very large number of poor children who stand most in need of their fostering care. This means more school-houses, more teachers, more appliances, a larger outlay of money. From this day, the kindergartens take on entirely new relations to the public. They cease to be a charity; they cease to be the privilege of any one class; they become the right of every parent who has children of the proper age. The kindergartens, if they are to succeed, must be thoroughly identified with the public school system of the city. The Board of Education had better have nothing to do with them, if it does not intend to incorporate them into the general educational system. You see, therefore, into how much larger a field of action the public schools will enter; in how many ways their influence will be extended. I do not stop now to consider the benefits which will flow from these changes. My object is simply to remind you that the establishment of the kindergartens as an integral part of the public school system is a work of no small magnitude; that it is fraught with many responsibilities; and that it is only by the hearty co-operation of Councils, the Board of Public Education and the Local Boards, sustained by an enlightened and liberal public

sentiment, that we may hope to lay such foundations and to rear such a superstructure as will enable the kindergartens to accomplish the work for which they have been instituted.

I desire to have it clearly understood, however, that I believe the kindergartens will be worth all that they cost. They will extend the benefits of public education in the direction where it is most needed. The great mass of the children who attend the public schools spend only about four years within their walls. The pressing necessities of life require that every member of a poor man's family shall contribute something to its support. Before the children have got beyond the simple rudiments of a common school education, they are withdrawn and sent forth into the world to swell the great army of its toilers. Laws prohibiting the employment of children are of no avail as against this necessity. Vast numbers of men and women have never known what childhood means. The hard realities which the struggle for mere existence crowds upon them so early, deny to them the opportunity for the growth and nurture of those qualities of mind and heart which add so much to the sum of life's enjoyment, and from the loss of which it is so hard to recover. But we must not undervalue the little that is gained by these few years of schooling. It is of enormous benefit alike to those who receive it and to the community of which they form a part; and every addition that can be made to the school privileges of the great body of the people goes to enrich the national life—every day that their stay in school can be prolonged is so much secured in the interest of a higher civilization. The city which can add two years to the school life of the mass of its children will confer a boon whose value it would be impossible to over-estimate. The chief argument in favor of the kindergarten is that it enlarges the privileges of the schools where the greatest number can avail themselves of their benefits. It increases

by just so much the possibilities of elementary education for the very large numbers of young children who now receive the smallest benefit from the schools. It is plain, therefore, that the kindergartens, while not organized exclusively in behalf of the poor, will inure chiefly to their benefit. They will provide educational opportunities that are immediately within their reach, and thus, while ministering directly to their good, cannot fail to exercise a salutary influence upon the well-being of the entire community.

I have stated thus broadly the most obvious advantage of adding the kindergarten to the public school system, but it is by no means the only one of importance. The intrinsic merit of the training which is given to the child is the great consideration which should always be put foremost in discussing the claims of the kindergarten as a part of any system of education. The kindergarten is a new thing; but this hardly excuses the mistaken views of what it is and what it aims to accomplish, which are so prevalent. It is generally regarded as an invention for entertaining little children. Nothing could be farther from the truth. It is true that the kindergarten plants itself firmly upon the spontaneous activities of childhood, and recognizes the tendency to play as one of the strongest of these; but this is simply the starting-point of the system. From this, as a postulate, it goes on to lay down a scheme of training which aims at the harmonious development of every power and faculty of man's being. Froebel, the philosopher of childhood, from whose fertile brain and glowing heart the kindergarten proceeded, was not the first to advance this large view of human education. Pestalozzi, following in the steps of the great line of educational reformers which begins with Comenius, had proclaimed the true doctrine of human culture to consist in developing and training the physical, intellectual, and moral elements of man's nature, each in its just relations to

the others, into power and use. But it is the glory of Froebel that he, first of all, taught that this complete and symmetrical training must begin with the earliest days of childhood. The secret of the kindergarten is that it never loses sight of the fact that it is dealing with the undeveloped, untrained powers of a little child. It develops the body; it cultivates the senses; it strengthens the receptive, and calls into operation the active faculties of the mind; it trains the social feelings and makes each member of the little society feel that its happiness depends not upon itself alone, but is bound up with that of all its members. And all this is done by treating the child, not as a machine to be set in motion by the teacher, but as a living, spiritual organism which grows by the free use of its own powers, which gathers force from every effort that it puts forth, and which passes by insensible degrees from the spontaneous play of feelings and desires, to the conscious exercise of faculties that find expression in creating and doing, in the production of forms that are alike useful and beautiful, in the performance of acts that are inspired by love and duty.

But the kindergarten is even more than this. While furnishing a system of educational training perfectly adapted to the conditions of childhood, its fundamental principles contain the roots of a philosophy of education more truly in accordance with human nature, more complete, more practical, than any system which has ever been devised. As already indicated, it is really the outcome of the best thought and experience of all the great thinkers and teachers who preceded Froebel. The kindergarten methods which are not involved in the special processes appropriate to little children are applicable to schools of every grade; and it will be a happy day when these methods have found their way into the primary schools, grammar schools, high schools, and normal schools of the country. We cannot close our eyes to the fact that the people are

becoming more and more dissatisfied with the instruction at present given in our schools. There is an urgent demand for better results, and it behooves school officers and teachers to give heed to this call. It devolves upon them to find the remedy. My conviction is that we shall look for it in vain until we are willing to accept the motives and principles which constitute the essential spirit of Froebel's philosophy. Our education must be made to accord more truly with the dictates of nature, and it must be brought into more intimate and direct relations with the needs of society. The age in which we are living demands a richer culture for the masses of the people than the schools, as at present constituted and managed, supply. But we shall get none of these things until our teaching has been radically changed. What has been done here to-day is, I trust, the beginning of better things for Philadelphia. Every intelligent and earnest teacher in the city must find encouragement in the fact that there has been added to its school system a feature which has won the confidence and support of every leading educator in Europe and America. I am sure that every department of our schools will, by and by, feel the inspiring influence which will flow from the presence of the kindergarten. The methods of instruction and discipline now followed cannot fail to be largely modified by its principles. No thinking mind, no intelligent instructor, can withstand the witness which the kindergarten bears against formalism and tradition, and in favor of freedom and progress in education. May we not all hope that the kindergarten will prove the leaven that is to leaven the whole lump, and help to raise our education to a higher plane of power and usefulness!

If time permitted, it would be found profitable to notice some of the objections which are made to the kindergarten; but I have already trespassed too long upon your patience. There is one objection, however, to which I

feel it to be my duty to call your attention for a few moments. In reply to all that I have been saying as to the advantages of making provision for the education of young children, we are told by many well-meaning persons that little folk of so tender an age should not be sent to school; that the right place for them is their home, and that the best teacher is their mother. Far be it from me to say one word which could be construed into any distrust of the blessings of a well-conducted home or the loving care of a faithful mother; but in the progress which educational science has been making during the last half century, may we not find some reason for revising the judgments that we have been accustomed to regard as final? Experience, as well as the opinions of the ablest teachers, assure us that the sooner we begin to educate the child the better. I say *educate*, because we must make the broad distinction between the development and training of a human being, as Froebel understood it, and the methods of instruction which are still too common in our primary schools. To educate a little child, in the right sense of that term, is a very difficult task. The notions commonly entertained on this subject—notions, I fear, altogether too wide-spread—are, I beg to say, very erroneous. The skilled, experienced teachers are reserved for the higher schools, while the untrained novices, the failures in grammar schools, and, in many cases, the imperfectly educated class, are put to work in the primary grades. But no greater or more harmful mistake could be made. There should be an unanimous protest against employing poor teachers anywhere; but the discrimination should certainly not be made against the primary schools. I give it to you as my sincerest conviction that no community will ever get the best fruits of a system of public education until it employs women of culture and refinement, of training and experience, in the lower grades of instruction. My conception of a

kindergartner is that of a woman who meets all these requirements. We are beginning to find this out, and in many portions of the country the same requirements are made, and the same compensation is allowed to the teachers of the lower as to those of the higher grades. Now, given such teachers as I have described—and they are within the reach of any city that desires their services—I have no hesitation in saying that the young child can be better educated in the kindergarten and the primary school than by the unaided efforts of any mother, no matter how favorable may be the conditions which surround her. We forget how numerous are the cares and duties of a woman who has the responsibility of a household, and how little time she can give to the systematic training of her children. The kindergarten steps in, not to supersede the home, not to supplant the mother, but to supplement and complete the functions of both, so far as fuller and more thorough methods of culture are concerned. The kindergarten and the home, the kindergartner and the mother, become the closest of allies in all that relates to the physical, mental and moral well-being of the child. But all this is aside from the actual problem with which this and every large city has to deal. There are thousands of children in Philadelphia who know little or nothing of the influences which go to make up a home; whose only chance of receiving any training worthy of the name must come from other sources. Not only this, but there are multitudes of little ones who spend a large portion of their waking hours upon the streets, drinking in at every sense evil influences that poison the springs of their young life. It is to this class that the kindergarten opens its inviting doors, and asks them to come and receive the skillful training, the watchful care, the loving kindness, which may prove the saving grace of their lives. To these little ones, the kindergarten becomes all that home means

to your children and to mine. It opens vistas of happiness which would otherwise have remained forever closed to them; it brightens their daily life with the charms that attend the normal exercise of body, mind and heart; and it plants deep down in their inmost being seeds that long afterwards may bear fruitage in pure, useful and worthy lives.

I shall have to omit any reference to some practical questions that will come up at an early day in connection with the management of the kindergartens. Let me simply call your attention to the importance of organizing them upon the highest plane of excellence. A poor school of any kind is one of the most worthless agencies in the social economy; but a poor kindergarten is still worse. The kindergarten is yet so new in this country, its purposes are so little understood, and the supply of competent kindergartners is so limited that there is constant danger of its degenerating into meaningless routine and aimless effort. Far better have no kindergartens at all, than such as are mere travesties of the name. I must not conceal from you that not a few of this kind have managed to spring into existence everywhere. Nothing will maintain the kindergarten in its purity but the presence of broadly cultured and thoroughly trained kindergartners. This is the only condition on which it can live, and this is the practical difficulty which must be encountered wherever its establishment upon a large scale is attempted. We must expect to meet it here, and I can see no safeguard but in providing a training-school of our own—in connection with the Normal School, if that is thought best—from which we can draw an ample supply of kindergartners, fully equipped for the work. No doubt the attention of the Board of Education will be called to this necessity at an early day, and I am sure that, with the right public sentiment on the subject, it can be depended upon to take such action as the exigencies of the case may require.

But we need have no fears for the future. The rapid advancement which public education has made in Philadelphia during the past few years is the strongest assurance that this effort to enlarge the scope and increase the efficiency of the school system will be carried to a successful issue, as is every good cause which promises to promote the intelligence, the morality, the prosperity and the happiness of the people.

THE EXHIBITION OF INDUSTRIAL WORK.

The Exhibition of Industrial Work held in May, 1888 was so important an incident in the history of the public schools of Philadelphia that it seems proper that some statement of it should be made here. For a year or two previous, the small local exhibitions which had been held at the close of the terms in a number of schools had been largely attended; but the friends of the advanced position taken by the city on the question of manual training felt that a larger opportunity should be afforded to inform the people as to the nature of these new features of the public education, and to bring before them in tangible form the methods employed and the practical outcome of the training given. Although no formal action was taken by the Board of Education there could be no doubt as to its willingness to favor such a scheme. The insuperable difficulty which stood in the way was the very considerable amount of money that would be needed to defray the expenses of an exhibition which would present the various features of the manual instruction upon a scale and in a manner creditable to the schools of the city. The Board had no funds available for this purpose, and it did not feel justified in asking for a transfer of any portion of the appropriations specifically set apart for the several departments of the school system. But the assistance needed in this perplexity was soon forthcoming. The Public

Education Society came forward with a generous offer to become responsible for the entire expense of the exhibition. The only restriction it imposed was that nothing should be left undone which might be necessary to bring the exhibition up to the highest expectations of the public. This liberal and public-spirited proposition was accepted by the Board, a special committee was appointed, and in due time the exhibition was opened to the public.

The scope and purpose of the exhibition were fully and explicitly set forth in the circular issued at the time. This circular is given below as the best means of presenting the scheme of the exhibition in its entirety, and the various arrangements by which it was carried into effect. It affords me very great satisfaction to be able to state that every part of this extended program was fully realized. The great hall in which the exhibition was held was filled to overflowing with work representing several of the newer features of the instruction and training given in the schools, and the throngs which came to see the products of the children's intelligence and skill bore testimony to the growing interest which the people take in the improvement of the public education of the city.

Philadelphia Public Schools.

EXHIBITION OF INDUSTRIAL WORK, MAY 9, 10, 11, 12, 1888.

BOARD OF PUBLIC EDUCATION,
SUPERINTENDENT'S OFFICE,
March 3, 1888.

To the Principals of the Public Schools :—

The Board of Public Education has authorized an exhibition of all kinds of art, manual and industrial work done in the public schools, to take place at Horticultural Hall during the month of May; the Public Education Association of this city having generously provided the funds to defray the expenses of the same.

The exhibition will consist of all kinds of school work that can be represented graphically or objectively, viz.: manual training, industrial art work, sewing, kindergarten work, drawing, map-drawing, penmanship, clay-modeling, and manual work of every kind produced in the schools. It is intended to make the exhibition as complete as the means and time at command will permit without interfering with the regular school work.

The following outline of the plan, and directions for carrying it into operation, are for your information and guidance :—

The exhibition will include the following particulars :—

I. Pupils' work.

II. Drawings and photographic views of the school buildings.

III. An exhibit of the Supply Department of the Board of Public Education.

IV. An historical exhibit.

V. Statistical statements of the educational system of the city.

VI. An exhibition of school work representing the practical operation of the following departments:—

1. Manual Training School.
2. Industrial Art School.
3. Sewing Classes.
4. Kindergartens.
5. Cooking Classes.

VII. An exhibit showing the relation of the public schools to the other educational institutions of the city in which public school scholarships are held.

I. The pupils' work will form the most important part of the exhibit. It is intended to be a full and fair exhibit of the regular work of the schools performed since September last. The exhibit will include the work done in all the grades of the Primary, Secondary and Grammar Schools, as many classes of the Central High, Girls' Normal, and Manual Training Schools, as can be provided for, the Industrial Art School and the Kindergartens, as follows:—

1. PRIMARY SCHOOLS.—Drawing, Penmanship, Clay Modeling (Geometric Forms, etc.), and manual work of any kind done in the schools.

2. SECONDARY SCHOOLS.—Drawing, Map Drawing, Penmanship, Clay Modeling (relief maps, etc.), Sewing and manual work of other kinds.

3. GRAMMAR SCHOOLS.—Drawing (constructive, representative, decorative), Map-Drawing, Penmanship, Sewing, Clay Modeling (relief maps, etc.)

4. KINDERGARTENS.—All the gifts and occupations employed in the children's work.

5. INDUSTRIAL ART SCHOOL.—Model and Objective Drawing, Decorative Design, Clay Modeling, Wood Carving.

6. MANUAL TRAINING SCHOOL.—Free-hand, Mechanical, Architectural, Decorative and Map Drawing, Modeling in Clay (decorative, architectural, relief maps) Wood Work (carpentry, joinery, turning, pattern-making, model-

ing, carving), Iron Work, (vise-work, smith-work, tempering), Moulding, Brazing, Mechanical Construction, Electricity and its appliances.

7. GIRLS' NORMAL SCHOOL.—Drawing (constructive, representative, decorative), Sewing.

8. CENTRAL HIGH SCHOOL.—Drawing (constructive, representative, decorative, mechanical), Map Drawing.

II. The Department of Property and Buildings will exhibit photographs and drawings of the elevations and ground plans of school buildings recently erected, and drawings or photographs of two or three of the oldest public school buildings still standing in the city.

III. The Supply Department.—A representative exhibit of the supplies of every kind furnished to the public schools.

IV. Historical Exhibit.—Two school-rooms are to be fitted up to represent the arrangements and conveniences for public school education furnished by the city to-day and a half century ago, as follows:—

1. A school-room containing a complete outfit of the newest and finest furniture at present in use, black-boards, maps, charts, pictures, globes, text-books, stationery and appliances of every kind furnished by the Board of Public Education for the use of pupils and teachers.

2. A school-room restored as far as possible from the oldest furniture in the city, and intended to represent the furnishing and outfit of a school-room as far back as the material obtainable can be secured for this purpose.

V. Statistical Statements.

1. A large statistical chart showing the actual condition of the schools at the present day.

2. A large statistical chart showing the growth of the school system from its origin, by periods.

3. A chart showing the classification of the pupils in the various departments and grades of the public school system.

4. A map of the city showing the location and distribution of the school-houses of all kinds.

VI. An exhibition showing the practical operation of the following departments of the school system.

1. MANUAL TRAINING SCHOOL.—Classes engaged in Wood-work and Iron-work.

2. INDUSTRIAL ART SCHOOL.—Classes engaged in Drawing, Clay Modeling and Wood Carving.

3. SEWING.—A sewing class under the instruction of a sewing teacher.

4. KINDERGARTENS.—A kindergarten class pursuing the occupations and games under the direction of a kindergartner.

5. COOKERY CLASSES.—A cookery class from the Girls' Normal School under the direction of the instructor in cookery.

The classes in these several departments will be furnished by relays of pupils from the various departments of the school system which are represented. Stated times will be fixed for the exhibition of work done by these classes.

VII. An exhibit showing the relation of the public school system to other educational institutions of the city in which public school scholarships are held.

1. Drawings executed by pupils holding public school scholarships in the School of Design for Women.

2. Work done by pupils holding public school scholarships in the Pennsylvania School of Industrial Art.

3. Work done by pupils holding public school scholarships in the Towne Scientific School, University of Pennsylvania.

GENERAL ARRANGEMENTS.

1. The exhibition will be arranged in the main hall in the order of the Sections. The work of every kind done by the Primary, Secondary and Grammar Schools will be

exhibited by Sections, and each Section will be assigned a space proportional to its enrollment of pupils. The School of Practice will be assigned a space in line with the Sections.

2. Separate spaces will be assigned for the exhibits of the Central High, Girls' Normal, Manual Training, and Industrial Art Schools, and the Kindergartens, respectively.

3. Large wall exhibits and exhibits of a special character, will be assigned additional space outside of the main exhibition hall, but no exhibit of any kind will be received that is not approved by the Superintendent of Schools.

4. The public will be admitted without cards, but the pupils of the public schools will receive cards of admission, and arrangements will be made by which the pupils of the several Sections may visit the exhibition with their parents at stated times.

5. The exhibition will open on the morning of May 9th. The two days preceding the 9th will be given to the arrangement of the exhibits. Each Section will attend to arranging its own exhibit. All the exhibits must be in place by the evening of May 8th, and no additions to any exhibit will be permitted after that time. Each Section should have its exhibits selected, classified and ready to be put up by May 6th.

6. The exhibition will be open from 10 A.M. till 10 P.M.

7. An exhibition of the several classes of pupils at work will take place each day from 10 A.M. till 12 M., from 3 till 5 P.M., and from 7 till 9 P.M.

RULES TO BE OBSERVED BY PRINCIPALS IN PREPARING EXHIBITS.

1. All the work exhibited must have been done since September 1, 1887.

2. The drawings must be upon the white drawing paper supplied by the Board of Public Education.

3. The map-drawing must be executed upon the white paper furnished by the Board and *must be entirely free-hand.*

Maps representing the natural productions of the various Grand Divisions and the United States may be executed upon the tracing maps supplied by the Board of Public Education, and may be colored at the option of the teacher.

Large wall maps representing special geographical features may be executed at the option of the teacher.

4. Clay Modeling may include geometric solids, relief maps, and any other work of this kind done in the schools. Small relief maps (on panels not exceeding 14x10 inches) must be the work of individual pupils. Large relief maps, executed by a number of pupils, may be sent for exhibition.

5. Sewing exhibits should contain work of every kind done in the sewing classes. In selecting the exhibit, it should be made to represent the largest range of work possible.

6. The work of every kind exhibited must be the *exclusive work of the pupils*, and no exhibit will be received unless the Principal sending it shall certify to this fact.

7. It is important that the exhibit of each Section should represent all the kinds of manual work done in the schools. It will be desirable, therefore, to have a local committee for the purpose of making a proper selection for the exhibit to be sent.

8. Principals of schools intending to send an exhibit, will notify the Superintendent of Public Schools to that effect, on or before the first day of May.

Further information as to details will be furnished from time to time as occasion may require.

By order of the Special Committee on Exhibition of Industrial Work.

JAMES MACALISTER,
Superintendent Public Schools.

At the close of the exhibition a report was made by the special committee to the Board of Education containing a statement of all the details connected with the management of the exhibition and a good deal of information which will be of permanent value. Among other interesting facts it was stated that not less than 15,000 square feet of wall, table and platform space was occupied by the various exhibits, and that 85,000 persons visited the exhibition during the four days that it was in progress. The general sentiment entertained concerning the exhibition is no doubt correctly expressed in the concluding paragraph of the report:—

"The Committee cannot too warmly express its approval of the spirit displayed by Philadelphia in this great educational movement. The Exhibition is to be regarded as one of the most important events in our school history—important in its immediate influence, but vastly more so in its bearing upon the future. The feasibility of a general system of co-education of head and hand has been established beyond peradventure; and in presenting with more than usual detail the permanent features of the Exhibition, the Committee have been actuated solely by the desire to place on permanent record the part taken by Philadelphia in the inauguration of what must be regarded as the most important educational reform of the present time."

APPENDICES.

APPENDIX I.

SYNOPSIS OF THE COURSES IN DRAWING AND TOOL INSTRUCTION IN THE MANUAL TRAINING SCHOOL.

COURSE IN DRAWING.

The importance of drawing in its application to manual training cannot be over-estimated. It is, in fact, the first step in manual training. Without drawing, the use of tools becomes a mere mechanical imitation, and has little value as an educational factor. From the conception of the idea to its expression in the concrete material, the drawing is the medium through which the mechanical processes are logically developed and brought to a definite and practical form.

From the beginning, therefore, the pupil is taught to interpret working drawings, and to reproduce from them the indicated forms. He must understand the language in which they are described, and acquire by education and experience the ability to obey it.

While drawing underlies all industrial work, its application is not limited to mechanical construction. Throughout all the departments, drawing is the common language used in explaining facts, ideas and principles. By means of historical, botanical, and topographical maps, literary and economic charts, geometric and electrical diagrams, anatomical and geological sketches, the pupil graphically expresses the lessons taught in the class-room.

The course in drawing has three general divisions:—

First.—Constructive drawing, as the basis of all industrial pursuits.

Second.—Representative drawing, designed to educate the sense of form and proportion, to teach the eye to observe

accurately and to train the hand to delineate rapidly the forms of objects.

Third.—Decorative drawing, used as a means of cultivating the taste, and developing an appreciation and love of the beautiful.

FIRST YEAR.

CONSTRUCTIVE DRAWING. (*Mechanical.*)—Proper care and use of instruments; class study of the geometric facts of shape and size in typical solids; the method of representing and describing such facts applied in the preparation of free-hand dimension sketches of the exercises which are afterwards made in the shops; finished working drawings made to scale from them; orthographic projections; sections and intersections, and surface developments; lettering; conventional methods and technicalities in accordance with the best modern practice of the draughting-room.

REPRESENTATIVE DRAWING. (*Free-hand.*)—The analysis of forms, singly and in groups, prepares for their accurate representation on paper or the blackboard. Much practice is given in making drawings of various objects seen out of school, yet based upon the simple geometric solids, casts, and natural forms upon which the pupil has received instruction and practice in the school-room.

DECORATIVE DRAWING. (*Design.*)—Elementary geometric design; straight lines, curved lines, and their combinations; geometric figures; elementary conventional design.

SECOND YEAR.

CONSTRUCTIVE DRAWING. (*Mechanical.*)—Preparation of finished working drawings from free-hand dimension sketches, from blackboard drawings, and from dictated directions; drawings of patterns and forge work to be used in shops. Shop tools and machine details—such as calipers, wrenches, pipe fittings, pulleys, details of engineering structures; parts of lathe; steam engine, etc.; development of surfaces applied in preparing working drawings for tin-smithing exercises.

REPRESENTATIVE DRAWING. (*Free-hand.*)—Representation of the appearance of rectangular and circular objects, with shades and shadows. Free-hand drawing from simple casts and natural forms.

DECORATIVE DRAWING. (*Designing.*)—Typical historic forms, and simple natural forms conventionalized; design to fill given space; borders and surface covering; principles of

arrangement; repetition; alternation; cumulation; radiation; symmetry.

THIRD YEAR.

CONSTRUCTIVE DRAWING. (*Draughting.*)—Machine drawings, tracings, and blue prints, made from blackboard and notebook sketches; drawings of steam engine and electric motor to be used in the "projects" in the shops; isometric drawing; ornamental coloring and India ink shading with pen and brush; designing of screw threads, gear wheels and parts of machinery, from specifications; plotting of irregular mechanical movements.

REPRESENTATIVE DRAWING. (*Free-hand.*)—Advanced free-hand drawing from models, casts, natural and historic forms; light and shade; coloring. Elements of linear perspective and the perspective of shades and shadows.

DECORATIVE DRAWING. (*Designing.*)—Geometric, historic, and conventional forms in design; analysis and conventionalization of natural forms; designing of repeated patterns and repeated forms; planning of ornament. Applied design; analysis of colored designs; original designs in color and in relief.

BUILDING CONSTRUCTION AND ARCHITECTURE.—The object of this Course is to familiarize the pupil with the typical forms, processes and principles of building construction, the elements of planning and design, and sanitary conditions; to present the subject of architecture from an historical standpoint, and combine therewith the comparative study of structural and ornamental features; and to cultivate a taste for the beautiful in art and architecture.

Illustrated lectures, study of notes, drawings, charts, photographs, ornamental forms, reference books.

Study of existing buildings and structures, and the typical forms found therein, with special reference to the application of the principles of construction in stone, brick, wood, iron, etc.

Examination of buildings in course of erection, for methods and processes; building materials.

Architectural sketches and drawings; blackboard illustrations; typical forms seen in buildings—structural and ornamental; figured sketches of the building selected by the pupil for set of architectural drawings—foundation and floor plans, elevation, vertical section, perspective view and details; study of historic ornament.

CLAY MODELING accompanies the more advanced work in draw-

ing from casts and natural forms, and design in low and high relief. In modeling in clay, as well as in the wood carving, it is the aim to give a better conception of form and proportion than is attainable on the flat surface.

Simple studies of ornamental forms from casts and carvings; modeling of single plant forms from nature; original designs in relief.

Modeling from designs, drawings, photographs, carvings, casts and nature.

COURSE IN TOOL INSTRUCTION.

In this department, which is the distinctive feature of the school, each exercise involves a mechanical principle, and the chief object of the instruction is the development of this principle rather than a finished piece of work. The exercise has value only as it has rendered educational service during its construction. In the changing conditions of the thing in hand during its construction, there is a constant necessity for creating new means to meet new requirements, and the directive skill thus evolved makes manual training rise to the level of scientific or mathematical studies as a means of intellectual development.

Other values of a specific nature—accuracy of measurement, precision of adjustment, delicacy of manipulation, exactness in every particular—must be taken into account in estimating the educational value of manual work.

All the articles made in the shops are required to be of precise forms and dimensions given in a drawing made by the pupil himself previous to taking up the exercise. The aim is to teach the pupil to express his thought in a concrete form, with the least waste of material, in the most workmanlike manner, and in accordance with the most approved methods.

First Year.

In the wood shop, in the first year, the pupil begins by laying out his work on a piece of rough board; he then proceeds with various exercises in sawing, planing, squaring, chiseling, mortising, mitering, nailing and dovetailing,—receiving in the meantime lessons in the design, structure and use of tools.

Running parallel with the work in joinery, and occupying the same length of time, is a course of vise-work, which includes chipping, filing and fitting of plane and curved surfaces.

Second Year.

In the second year, the course in wood-work is continued in a series of exercises in pattern-making, which are afterwards used in the foundry in moulding and casting. In connection with pattern-making, the pupils are taught wood-turning.

In the manipulation of wood and cold iron, the material will wait for the pupil to exercise his judgment as to the best method of doing the work. In the forge shop, however, where hot iron is to be manipulated, quickness is an essential requisite, the necessity of "striking while the iron is hot" being imperative. As a preliminary step, the processes involved in forging are first worked out in lead. The operations are then performed in hot iron in a series of exercises in drawing out, upsetting, shaping, bending, and in the making of rings, bolts, chains and tongs. Welding and the tempering of steel follow; and, at the end of the second year, each pupil is required to make the chisels and a set of turning tools for his third year's work in the machine shop. A short course in tin-smithing and brazing is also taken up the second year.

Third Year.

In the third year, the principles taught the first and second years are practically applied to mechanical construction. In the wood shop, each pupil is required to make one or more models, such as planes, pulleys, parts of machines, etc. In the machine shop is a course of vise-work involving the chipping, filing, and fitting of curved and plane surfaces used in machinery, and also a course of iron turning. As a final exercise, the class will be required to make from their own drawings and measurements, as a "project," some mechanical construction embodying the principles they have been dealing with and the practical ability they have acquired.

A course in wood-carving forms a part of the work of the third year.

SYNOPTICAL TABLE OF THE COURSE OF INSTRUCTION.

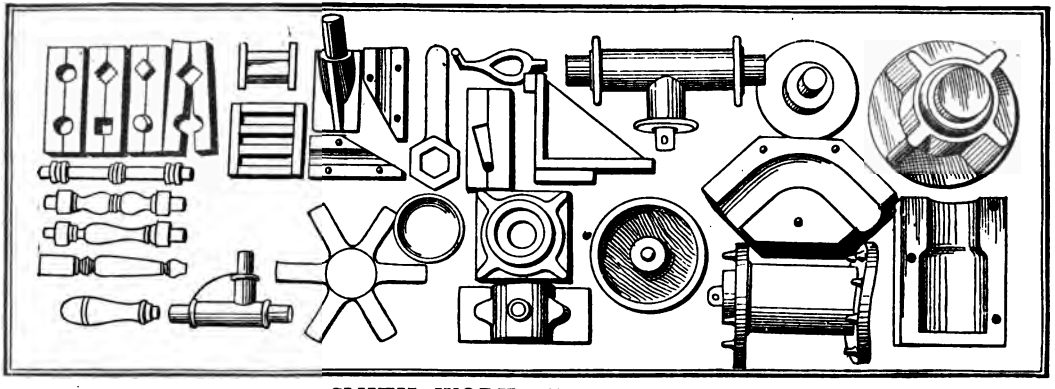
	CLASS D, 1st TERM.				CLASS C, 2d TERM.			
FIRST YEAR	**1st Month**	**2d.**	**3d.**	**4th.**	**5th.**	**6th.**	**7th.**	**8th.**
Elementary Drawing and Designing	Non-Imitative and elementary line work		Conventional forms		Plant forms		Combination of preceding forms	
Blackboard Drawing	Units of above		Units of above		Units of above		Units	
Model and Object Drawing	Simple Geometric forms in linear		Plant and Vase forms		Animal forms		Arrangements of preceding forms	
Clay Modeling		Non-Imitative and elementary forms				Conventional and Plant forms		
Wood Carving				Linear Square straight and angle cutting				Simple low relief

	CLASS B, 3d TERM.				CLASS A, 4th TERM.			
SECOND YEAR	**1st Month**	**2d.**	**3d.**	**4th.**	**5th.**	**6th.**	**7th.**	**8th.**
Drawing and Designing	Greek elements and style		Roman elements and style		Moresque elements and style		Gothic elements and style	
Blackboard Drawing	Units of above		Units of above.		Units of above		Units of above	
Model and Object Drawing	Geometric forms in Perspective		Plant or vase forms in perspective		Animal forms foreshortened		Arrangements of preceding forms	
Clay Modeling		Elements used in drawing for the preceding month				Elements used in drawing for the preceding month		
Wood Carving				High and low relief in style				Original panel

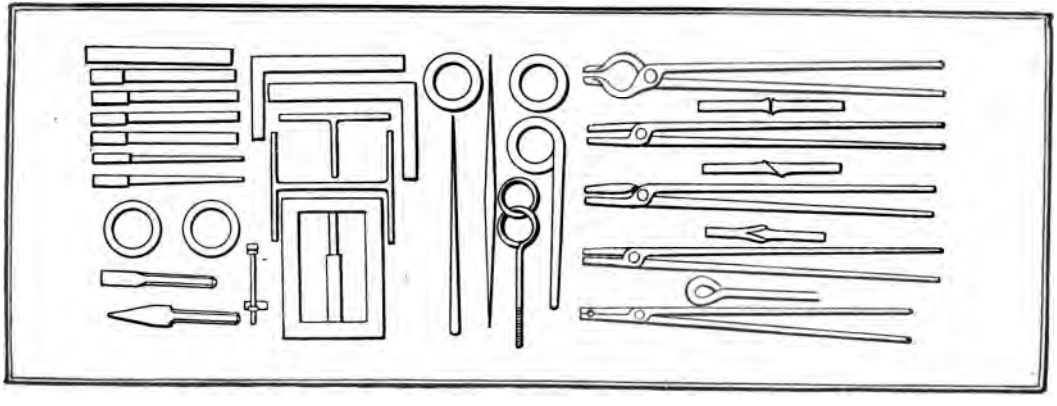
CARPENTRY AND JOINERY—(First Year).

VISE WORK, CHIPPING, FILING AND FITTING—(First Year).

PATTERN MAKING AND TURNING—(SECOND YEAR).



SMITH WORK—(SECOND YEAR).



APPENDIX II.

SYNOPSIS OF THE COURSE OF INSTRUCTION AND TRAINING IN THE INDUSTRIAL ART SCHOOL.

BLACKBOARD WORK.

1. Free-hand drawing on the blackboard by each pupil every session in the designing rooms.

2. Pupils will invariably begin with the first period unit and elements upon entering the school.

3. Lectures and blackboard demonstrations on the structure and meaning of ornament and design in material.

MODEL AND OBJECT DRAWING.

1. All work must be free-hand in this department; no rules or compasses.

1. Simple geometric forms in linear. 2. Plant and vase forms. 3. Animal form. 4. Arrangement of preceding forms. 5. Geometric forms in perspective. 6. Plant forms in perspective. 7. Animal forms fore-shortened. 8. Arrangement of preceding forms.

CLAY MODELING.

1st Period.—Non-imitative and elementary forms. 2d. Conventional and plant forms. 3d. Elements used in drawing for preceding month. 4th. Elements used in drawing for preceding month.

1. How to temper the clay, keeping moist, wedging, etc.
2. Training in the use of tools.
3. Modeling in low and high relief from original designs.
4. Modeling in low and high relief from casts.

WOOD CARVING.

1st Period.—Linear, straight, square and angle cutting. 2d. Simple low relief. 3d. High or low relief in style. 4th. Original panel.

1. Instruction in the use and care of tools.
2. The transferring of designs.

3. Low and high relief carving in hard wood, bosses, scrolls, mould sinking.

4. Carving enrichment for cabinets work, panels, etc.

ELEMENTARY DRAWING AND DESIGNING.

1. Non-imitative elements and line-work. 2. Conventional forms. 3. Plant forms. 4. Combination of preceding. 5. Greek elements and style, 6. Roman elements and style. 7. Moresque elements and style. 8. Gothic elements and style.

1. All work to be free-hand.

2. Designs in the various grades in every case to be original and for the purpose of being used in wood, clay, metal, fabrics, etc.

3. The importance of designing for some purpose, and in some material, to be kept constantly in view.

4. Making designs to obtain proficiency in linear drawing and simple washes.

5. Working designs in monochrome for training the pupils in handling the brush.

APPENDIX III.

SYNOPSIS OF THE COURSE OF INSTRUCTION AND TRAINING IN SEWING FOR GIRLS' SCHOOLS.

SECONDARY SCHOOLS.[1]

Fifth Grade.—Five months.

Position of the pupils while engaged in sewing.

The proper use of the thimble finger, first finger and thumb of the right hand. Position of the left hand for holding the work. Drill in the same.

Exercises in the action of taking a stitch and drawing the thread through the material.

Drill in the threading of the needle. (Needles and thread may be given out at the beginning of the lesson.)

Turning, basting and sewing plain hems. Attention to be

[1] In Philadelphia the term Secondary is used to designate the schools which include the third and fourth years of the course of instruction.

given to accuracy in width of hems and size of stitches used in basting and hemming. Correct use of the scissors (paper may be supplied for this purpose).

Over-seaming on turned edges; the raw edges may be turned in and hemmed down.

If more material is needed than that furnished by the Board of Education, towels, wash-rags and similar articles may be hemmed.

Sixth Grade.—Five months.

Questions and exercises in the use of thimble, scissors, threading the needle, the direction of the needle as used in basting and sewing a hem. Time for these exercises, five minutes.

Over-seaming, with explanations and exercise in joining a new or broken thread.

Running seam, composed of one running and one back-stitch; the raw edges to be overcast.

Cutting out and making simple articles, *e. g.*, children's bibs, plain over-sleeves.

Work brought from home may be table-napkins, towels, bags, desk-covers and pillow slips.

Seventh Grade.—Five months.

Questions on position, the proper use of the thimble and scissors. Exercise in threading the needle. Questions on the direction of the needle when used in basting, hemming and over-seaming. Time for this exercise, five minutes.

Reversible seam.

Plain fell, sewed with running stitches, strengthened by an occasional back-stitch and finished with hemming.

Back-stitched seam overcast on the raw edges. Patching commenced.

Cutting out of plain under-waists without seam under arm.

Work brought from home may be towels, table-napkins, pillow slips, ruffles to hem, bags and worn articles that may need patching.

Eighth Grade.—Five months.

Questions on the work of lower grades. Time for this exercise, five minutes.

Plain fell repeated. Gathering, placing or stroking the same.

Sewing the gathers into a band, using half back-stitching; the band finished with hemming.

Darning commenced. Work to consist of stocking darning and dress darning.

Cutting out patterns of under-waists and aprons of all kinds.

Work brought from home may be aprons, under-waists, combing-towels, shoe-bags, ruffles to hem and gather, darning and mending.

GRAMMAR SCHOOLS.[1]

Ninth Grade.—One year.

Narrow hems; hems of medium and broad widths.

Tucks. Threads should not be drawn from the material to secure straight tucking.

Narrow plain fells. French fells.

Fine gathering, hemmed to a band.

Button-holes. Gussets.

Shirt, or other four-holed, buttons sewed on.

Stocking mending and patching.

Cutting out and making drawers from actual measurements.

Shoe-bags, sleeves, aprons, muslin skirts, and plain under-garments may be brought from home to be made and kept in school until finished.

Tenth Grade.—One year.

Bias seams of all kinds.

Gathering, as done on dress skirts, to be over-seamed to a band.

The two stitches used on flannel under-garments, viz.: herring-bone stitch and feather stitch.

Button-holes.

Cutting out and making gored skirts.

Children's plain underwear, boys' shirt-waists, collars and cuffs, dusting-caps and plain flannel skirts may be supplied from home.

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[1] The Grammar Schools include the fifth to the eighth years inclusive, of the course of instruction.

Eleventh Grade.—One year.

Questions and review of all work done in previous grades.

Paper patterns drawn and cut for under-garments from actual measurements.

Material for such garments brought from home and cut out in school. Pupils taught to place the patterns properly and economically on the muslin.

Work basted and fitted on the pupils.

Twelfth Grade.—One year.

Review of all work done in previous grades.

Pupils should be required to decide which seams should be used for the several parts of garments cut and made in this grade.

First steps in dressmaking.

Method of basting lining and material together, for dress waists and sleeves. Trying on and fitting the same.

Adjusting facings to lined, gored skirts; sewing on braid, etc.

Mending of all kinds must be encouraged by the teacher.

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MANUAL TRAINING IN FRANCE

BY

A. SALICIS

Late Inspector General of Manual Training

Suggestions for the TEACHING OF COLOR

BY

HANNAH JOHNSON CARTER

Professor of Form Study and Drawing, New York College for the Training of Teachers

MAY, 1890

NEW YORK: 9 UNIVERSITY PLACE

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PREFATORY NOTE.

The manuscript for the paper which follows on Manual Training in France, was placed in the hands of the editor by Gustave Adolphe Salicis but a few weeks before his death in December last. A sketch of M. Salicis' life and educational activity was published by the New York College for the Training of Teachers as Leaflet No. 51.

The translation has been carefully made by Benjamin D. Woodward, Instructor in the Romance Languages in Columbia College.

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NEW YORK COLLEGE FOR THE TRAINING OF TEACHERS.

Entered at Stationers' Hall.

Manual Training in France.

Nature wishes that those who work should first be esteemed and rewarded by the measure of their salary.—CONFUCIUS.

I have always noticed that among workmen, good apprentices make good citizens.
—B. FRANKLIN,
(Codicil to his testament.)

We have been created to act and to produce.—CHANNING.

The aim of education should be to prepare us for complete life; therefore education should furnish the individual with the means of providing for his existence.
—HERBERT SPENCER.

There is nothing at all new in the idea of completing man and doubling his value by teaching him at an early age to make use of his hands. We have reason to be astonished at not finding a greater number of manual instructors, and also that no country has thought best to introduce into its public schools the use of the HAND, the simplest, cheapest, most universal, most obedient and most marvelous tool in our possession.

If we stop to think of the sum of the countless efforts of all kinds that have been spent since the formation of society solely on the unfolding of brain powers, it might prove interesting to consider what would be the present state of the world if the millionth part of this outlay in mind and money had been appropriated to create and make fruitful in successive generations a love for concrete work in all its forms—a love such as would be called forth, fostered and promoted by bringing about an appreciative coöperation between the taste and the judgment, the eye and the hand.

In this connection the following quotation from Channing is generally known, in the United States at least: "Manual training is a school where men are put to acquire energy of purpose and of character, a conquest which is far more valuable than all the knowledge of the schools."

Not less familiar are the opinions of Pestalozzi, Condorcet, Rousseau, Locke, and Montaigne, all of whom would surely agree with the English philosopher in saying, "since it cannot be hoped that a child will have time and strength to learn everything, the result is that he should be taught especially those branches of which he is most in need, and which will be of greatest and most frequent use to him in the world."

Already in his day Seneca complains that this was not the case: and this inconsistency must be strikingly apparent, for Détrouve himself, whose mind was radically different from that of the Seneca, has thought it his duty to say in his *Satyricon*:—

"Those who are in charge of the studies of young people do not devote sufficient care to make them familiar with what is most intimately connected with every-day life; thus it happens that when they do breathe the atmosphere of the surroundings among which their destiny calls them, they believe they have been wafted into a different world."

For many centuries there has been no great change in the education of those classes whose livelihood depends on the daily work of their hands. It would seem as though the book or the paper were the only things they would have to handle, and as though the pen were the sole tool they would have to make use of. Book, pen, and paper are put into the hands of children from their fifth to their thirteenth year, and they submit during all this time with passive indifference to being saturated with the one taste for literary things. Then, when they have been carefully perverted both intellectually and physically with respect to the future which awaits them and when the gate of life finally stands wide open before them, they are calmly expected to enter it not only unarmed but wholly unprepared.

Does this mean that the actual primary instruction

should be slashed to pieces, and that one excess should be substituted for another? What rash voice could formulate such an idea? By no means, for every nation has its main roots buried in the mass of elementary knowledge. If it be in the nature of things that we children of the same country are called upon to follow different paths, we may at least have the same language, write it in the same way, and share the same history. However, if the introduction of manual labor become general, let no one scorn the tools, the needles, the scissors, which we all shall have learned to handle. On the contrary let each one esteem modesty and courage in their attempts to lead a creditable and useful life.

Far then from wishing to weaken primary instruction, I believe it can be conceived of as strengthened, but different: it would be reduced perhaps by half as a time for study, but in return a double harvest would be reaped by thinning out the requirments, very much in the same way as a forest is cleared in order to strengthen its trees. The new departure would consist chiefly in introducing into the new system concrete methods of instruction, revealing such principles as can be assimilated on the spot, and yielding such results as will be useful later on.

This is in part the aim sought by the Academy of Medicine in the active war it is waging against intellectual over-pressure. This is moreover the tendency, clearly defined nowadays in France, as well among the guardians of public instruction as in the legislative halls and in the general enlightened opinion of the country.

It was in March, 1882 that the Chamber of Deputies voted in favor of making manual training obligatory for the different grades of primary instruction. Thus was realized in a much larger sense the scheme which Condorcet laid before the Convention nearly a century ago, and which the strong heads of the time naturally dubbed

Utopia; it was spoken of as Condorcet's Utopia! Very happily this is the way with a goodly number of Utopias; to-day they are follies in the sight of barren scepticism, and to-morrow they are fruitfully fulfilled.

Up to 1882, manual training was not altogether wanting in France; but where it did exist, it was chiefly in the form of apprenticeship, or rather of undivided preparation for one special calling. The institutions offering this training bore the characteristic names of apprentice's schools, industrial schools, technical schools, schools of arts and trades, and so on. These institutions were private corporations; their number was very limited and they could not give to their pupils the general stamp which is inherent in a nationally ordered instruction.

Beginning at the very foundation, and in keeping with the spirit of the law, the State has organized and is still busied in organizing, institutions which are *primary* above all; just as are those whose fundamental principles are the book and the pen. The State should no more aim to turn out accomplished workmen after a course in simple manual training, than it claims to graduate thirteen-year old literati and historians on a pen and book instruction. But just as it ought to provide the pupils as far as possible with the knowledge necessary to spell their language correctly and also with the elements of a tolerable style, just so in manual courses it can spread a knowledge of the correct use of the principal tools and of the ordinary operations with them.

Given a child's nature, nothing else is needed in order to develop there the pre-existent germ which stimulates him to realization: he can then be roused to a taste for work, and this is the inevitable outcome of training an underlying skill. The whole secret is here: underlying skill, disclosure of tendencies, taste for work.

Far from being well under way in 1882 with this worthy end in view, all preparations for the journey had

still to be made; methods, buildings, stock of tools, body of instructors,—all this coupled to the great obstacle that on making the new studies obligatory, it had been forgotten to make any appropriation for them.

Thanks however to the stand taken by M. Jules Ferry, Minister of Public Instruction, and by M. Buisson, Director of Primary Instruction, a Special Normal School for Manual Training was decided on and was straightway created. Admission by competition was granted to forty-eight young school-teachers, graduates of the Université de France. They were taught there for one year the following branches:—

1. Experimental physics and chemistry as illustrated in simple phenomena, i. e., such experiments as might be repeated in elementary schools; the instruction was collective but the students had the privilege of individual manipulation.
2. Natural history, treated in the same way.
3. Plane trigonometry, algebra, and elementary mechanics.
4. Descriptive geometry with direct applications to perspective and to stereotomy.
5. Drawing, modeling, moulding, and graphic designing.
6. Treatment of wood at bench and turning-lathe.
7. Treatment of iron in the smithery, with vice and turning-lathe.
8. As subordinate studies; choral music, French literature, fencing, and fire practice.

This programme was to be completed at a later period by a scientific study of various fertilizers in their relation to the nature of the soil and to special productions. Repeated quizzes, competitive reviews, and practical trials kept these young teachers always on the alert. Although the programme was overcrowded for immediate needs, it was thoroughly carried out, and was satisfactorily assimilated in all its parts.

From an essentially manual point of view it covered about the following ground:

Stereotomy: Design and construction of a soffit, of a full centre, of a segmental arch, of a stilted arch, of a rampant arch; development of the same; stringer of a staircase.

Drawing and Modeling: Rendering of twelve models selected from the collection of the National School of Fine Arts. No modeling was done, unless preceded or followed by a design of the object.

Joinery: Besides preliminaries, twenty exercises in joining and ten summaries.

Smithery: Introductory details, fire-building, striking in presence of one, two, and three smiths, welding, rolling, measuring the calibre, tempering.

Millwright's work: Practice in flat and half-round files, mortise-chisel, graver, saw.

Wood turning-lathe: Railings of different styles, Médicis vase.

Metal turning-lathe: Slide cylinder.

Every object made was to be a material rendering of an off-hand sketch. A memorandum of each sketch was entered in a special workshop note-book, along with the teacher's private explanations and estimates.

The close of the year witnessed the establishment of a certificate of proficiency for such as were fit to teach manual work in the normal schools and in the higher primary schools. On examination this certificate was awarded to most of the students in the first promotion: the few backward ones obtained this distinction in the following year, along with twenty-four new students of the second promotion.

The Special School has thus graduated seventy-two professors of manual training: since then, the normal school in St. Cloud has swelled the list by a few adepts, and some independent teachers have shown themselves

so well versed in the several requirements as to pass satisfactory examinations in the same. Thus it is that now, in strict compliance with the law, each one of our ninety normal schools, including Corsica and Algeria, is provided with a competent professor of manual training. On the other hand these schools are fully equipped with laboratories, workshops, and tools: with respect to the new branches, the programme is identical with the one adopted by the Special Normal School, minus the above-mentioned 3rd, 4th, and the latter part of 8th. The course is completed within three years at the rate of four hours per week, a rate which seems very inadequate.

Still these normal schools are beginning now to graduate every year something like 1500 teachers, who are pretty well fitted to introduce the new studies in the numerous continuation schools. The outlook for the elementary schools is also bright, and it may be hoped that they will delay no longer in incorporating special teachers in their body of instructors. Summer schools are even being opened gradually in the normal schools to those teachers in each department who will pledge themselves to regular attendance. These voluntary teachers carry back to their schools a manual knowledge which is sufficient inasmuch as it is primary: their own works are their models and their note-book is their guide. The remainder of their equipment, which in the beginning need be only slight in the way of buildings and tools, will depend altogether on the General Councils and on the Municipalities.

In fifteen years from now, nearly all our primary high schools and most of our 40,000 elementary schools for boys ought to provide our 2,750,000 male children of the working-classes with the instruction which will fit them completely for the future they have in store.[1]

[1] If we do not speak of the girls, it is because they have already to a certain extent a suitable *primary* manual training, consisting of needlework, cutting out, and dressmaking.

This period of expectation would have been shortened, and the standard of manual training would surely have been raised, if the Special Normal School for Manual Training, founded by M. J. Ferry, had been developed instead of suppressed by his second successor; unfortunately, ministers have this point in common with the days,—they follow upon one another without being alike.

It is a fact that everywhere, without exception, where the equipment is decent and the professor suitable, manual training is as much of an attraction to the pupils of various ages as to the student-teachers of the normal schools. The recent convention of academical rectors and of general inspectors of primary instruction, presided over by the Minister, was unanimous in favor of the new departure: such was the interest manifested by the students of the normal schools, that at times it had even been necessary to restrict their enthusiasm in workshop matters. We wish it to be always well borne in mind that we are dealing here only with the question of *primary* manual training, such as is generally given by the State.

Inasmuch as the variety of private enterprises is as great as the number of individual callings, it is not to be expected that their soul and mechanism should emanate from the government. In this case, it is a matter as we have already stated of regions, departments, cities, industrial syndicates or private concerns. These special and varied demands have for some time been met in France by a large number of private establishments. The last few years have seen them well started towards rapid enlargement, and the organization of syndicates can only hasten their development.

Heretofore the State was satisfied with providing a few important typical institutions, such as the National Schools of Arts and Trades which were founded long ago in Châlons, Aix, and Angers. The experiment is to be completed by trial district-schools in Vierzon, Voiron, and

Armentières. These schools, like the former ones, will receive boarders and will give instruction from the primary department up to a well-defined idea of the industrial occupations of the country.

The rapid spread of general manual training is greatly hampered by the lack of space available in primary schools and moreover by a temporary scarcity of the department and communal funds. Great sacrifices have been required and made in view of building local railroads, town-halls and school-houses, and, as is always the case, noble impulses have been followed to the detriment of future welfare. Nevertheless, besides these primary high schools which are being equipped day by day, there is a very large number of elementary schools which have now introduced manual training in various stages. At all events the difficulties have been diminished, in a measure, by the programmes adopted by the High Council of Public Instruction, small classes being assigned such work as requires neither workshop nor special equipment.

For the time being and awaiting further reforms, manual work enters under the head of physical education. A synopsis of the same is as follows:—

BOYS.

5—7 Years.	7—9 Years.	9—11 Years.	11—13 Years.
Easy exercises in plaiting, folding, and weaving. Cutting out pieces of colored paper and uniting them in geometric designs. Easy basket-work. Combinations of colored worsteds on canvas or on paper.	Development of dexterity. Construction of geometric solids out of paste-board. Basket-work, combinations of many colored twigs. Modeling. Reproduction of geometric solids and of very simple objects.	Wooden slips adorned with painted pictures and colored paper. Easy wire-work; trellis-work. Combination of wire and wood-work; cages. Modeling simple architectural ornaments. Facts about the most common tools.	Combined exercises in drawing and modeling. Objects sketched on a given scale and vice-versa—objects reproduced from a sketch on a given scale. Chief tools used in wood-work. Graduated exercises. Planing, sawing wood, simple joinery. Boxes, nailed or put together without joints. Turning-lathe. Turning very simple objects. Chief tools used in iron-work. File exercises, paring or polishing rough pig-iron and cast-iron.

GIRLS.

5—7 Years.	7—9 Years.	9—11 Years.	11—13 Years.
Easy Froebel exercises. Plaiting, folding, weaving. Knitting small articles.	Knitting and study of the stitch. Meshes on the right and wrong sides. Ribbed work, increasing, diminishing. Making stitch, on canvas. Elements of sewing. Hems and overcastings. Manual exercises to develop dexterity. Cutting out and joining colored paper. Easy trials in modeling.	Knitting and taking up loose stitches. Marking on canvas, forward stitch, side stitch, back stitch. Overcasting-stitch. Plain seam, hem; double seam. Overcastings on selvedge. Overcastings on turned in folds. Towels, napkins, handkerchiefs, aprons, shirts: piecing.	Knitting skirts, jackets, mittens. Marking on linen. Stitching, gathers, buttonholes. Mending garments, darning. Elements of cutting and making up very simple garments. Elements of domestic economy in its relation to the kitchen, to washing clothes and keeping them in repair, to the toilet, to household duties, to the garden, and to the poultry-yard.

Such is nowadays in France the part which manual training plays in elementary schools. This programme may be altered to meet the wants of any and every school, and in such a way that each school can select a part of the whole in keeping with its means. In any case the Council of every department is vested with a certain authority in matters of changes such as it may seem wise to bring about in local applications of manual training.

A committee has recently been formed with the mission of studying up the question of agricultural training in normal schools, primary high schools, and elementary schools.

Personally we do not think that the type of programme shown above should be maintained as a whole, at least as far as the boys are concerned.

It seems to us that up to the eleventh year there is not a sufficient demand made upon individual thought and judgment, or upon the complete subjection of the hand to an instantaneous decision of eye and will. Moreover, physical strength meets with no means or incentive to develop. Weaving, basket-work, plaiting,—all this is quiet work, where the fingers are trained to move evenly and mechanically, without any intellectual exertion. The proof of this lies in the fact that this kind of work is introduced with greatest ease in the asylums for the blind and weak-minded. We believe that the true aim of manual training should be to accustom a child at an early age to work standing, and as far as possible, to bring all parts of his body into play. Does he not do this anyway, if left to himself? Is it not a source of continual wonder to see the youngest children stand from morning to night: they are on such a constant go that it is impossible for their parents to keep up with them. And then, thanks to this healthful weariness, when night comes on they fall into a sound sleep from which they arise at early dawn refreshed and ready to begin all over again.

The needs of a child are made evident by his love for hoops, tops, ball-playing in all its phases, and so on. A child must dig ditches, build dams, climb trees, and experiment with the power of his lungs: he must do all this and in the same day. He will even skip his meals, if he has a chance.

It is very true that all this cannot be done in a school: still the natural inclinations of a child should not be tampered with, but this overflow of vital energy should be controlled in such a way as to direct the main course into a channel of future usefulness.

Thanks to the freedom of scope and means which the Municipal Council of Paris has given us, it is on these lines that we seek to promote manual training in the public school of Rue Tournefort. We lay special stress upon our methods, because this institution realizes a type whose tendency is to spread as a whole or in part.

There, all children from the ages of six and seven years have a part in active manual work. As soon as they enter school they begin modeling, and they keep up the study during their entire school course. They are also taught to treat soft wood with the saw, the rasp, the chisel, and the mortise-chisel. They are then advanced to the plane, the turning-lathe, and the iron-work including furnace duty.

At a very early age they begin to sketch on a given scale, all draughting being recorded in a note-book which is never to leave them. These memoranda are chaotic at first, but they assume rapidly a definite shape: the accounts of daily work are tabulated as regards the nature of the work, its material, and the time spent on it.

The school is made up of five classes, the highest being intended for special or post-graduate work.

12–14 years	Special	Class	devotes	21	hours	a	week	to	manual	work.	
10–12	"	1st	"	"	8½	"	"	"	"	"	"
9–11	"	2nd	"	"	5	"	"	"	"	"	"
8–10	"	3rd	"	"	4	"	"	"	"	"	"
7–9	"	4th	"	"	3	"	"	"	"	"	"

No attempt is made to specialize before the Special Class. Once there students are given successively finishing touches in a complete general training, but besides that, they have access to such special branches as will foster more especially an avowed bent.

The new instruction involves an additional expense of 15000 francs a year; the school receives 260 children, and were it not for its small quarters it could take in 300 without its outlay being increased other than by the expenditure for raw material.

This institution has been in operation now for nearly sixteen years, and the experiment may be considered a success from the triple point of view of hygiene, general instruction, and practical results. The children thrive notwithstanding the fact that their attendance in school is longer by two hours than the usual regulations provide. Their occupations are so varied, in accordance with their mental and physical aptitudes, that there is no sign of weariness after their exertions of mind and body. Ardor pervades them in a characteristic way: their heaviest punishment is to be debarred from the workshop.

As regards instruction, the annual examination ordeal for the certificate of proficiency in primary studies is a sufficient relative criterion: it proves that the scholars from the Rue Tournefort are among the best off, as far as scholastic knowledge is concerned. Thus, in addition to what their comrades in other schools know, they are indebted to the new instruction for all the manual training they have acquired. The practical results are made manifest in the facilities for finding good apprenticeships, for reducing their length, and for being sooner compensated.

Besides choice workmen devoted to their calling, this school has graduated expert accountants, teachers, professors even of higher branches, and artists: one of these, famous when twenty years old for his water-colors, is now much sought after by New York publishing houses.

Of the two hundred boys' schools in the city of Paris, about one-half are equipped with benches and turning-lathes, at which the older scholars do manual work. The Municipal Council and the Board of Instruction are both endowed with the very best will, and still they have not dared to settle definitely the amount of importance to be attached to primary manual training. As a consequence, this instruction is somewhat subordinate, and up to the present time the results attained are not in proportion to the sacrifices made. Another cause of delay is the lack of teachers well qualified in point of methods and *statements*. As a matter of necessity workmen are called in: they are good practical men as far as their own work goes; but when it comes to imparting knowledge, their teaching is decidedly empirical.

This state of affairs has very happily reached a climax and a sweeping change will take place: the teachers will now be recruited from the ranks of Normal School graduates of the department of the Seine.

We have stated above that nowadays all normal schools give manual instruction: the school at Auteuil especially, (Seine department), has been thoroughly equipped for the past three years and graduates every year some thirty teachers who are well able to fill to some advantage the places of present workmen.

The case will be the same in other departments in proportion to their population.

At all events the extension of manual knowledge can only be hastened still more by the decisions of the Higher Council of Public Instruction. Ministerial resolutions, and if need be, special decrees insure to these decisions a legal sanction.

In accordance with them all, every primary high school must be provided with a workshop, and there shall be awarded certificates of proficiency in higher primary studies, including manual work. These two, three, and

four year schools are urgently demanded by the departments and cities: they apply to a part of the studying population that has already received the certificate for elementary primary instruction, and that is not compelled to seek directly an apprenticeship.

Now it happens that the committee intrusted with the revision of the programme desires to retain a general course of study during the first year only in the high schools: this year should be a sort of review. Then from the second year on the studies are to become more and more professional, and are to be based chiefly on the main industries of the country. Manual training will be obligatory four hours a week during the first year, five hours in the second year, and six hours throughout the third and fourth years.

If *we* take into account that the prime elements of this training have had full chance to become assimilated in the elementary school during a minimum period of six years, *they* will surely bear fruit after an average apprenticeship of four years, or after an additional special training in the high schools.

The outlook should be a bright one for future generations, inasmuch as being better prepared to battle with life they will show greater love for work, and will be all the more happy and honored on that account.

Suggestions for the Teaching of Color.

As psychology recognizes the important part that color plays in the development of the child's mind, the delight produced by the color sensation, and the fact that external forms are more readily perceived where it exists, there seems a need of proper and systematic teaching of this subject in our schools. Just what may be done, how much, and the exact value of such teaching we cannot determine at present, but a few suggestions as to ways, means, and possibilities may, I trust, be helpful. The manner of teaching this subject of color will undoubtedly always be more or less individual, and subject to existing conditions in various localities; yet there are certain fundamental laws and principles which certainly should be understood by the teachers in our schools, however little opportunity they may have for using them. We do know to be sure that a keen, sensitive color sense is inborn, a gift to the fortunate individual, like a retentive memory, great power of speech, or a musical voice; but when we observe how savage even now is the taste of the masses, surely much may be done in quickening and guiding the national taste by judicious training. We never do anything by halves here in America. Because some "artiste" in modes in a moment of inspiration throws certain colors together, audacious in combination, possible only when arranged by a master hand, the effect softened here and there by a deft touch, straightway many of our maidens steal the audacity but miss the artistic knowledge or inspiration. Who has not suffered from the bright green

dresses recently worn, when because it was fashionable to wear flowers as a decoration, a bunch of violets or bright crimson roses often became the prominent adornment. A blonde feels that blue is her color, so with a blind freedom from all restraint as to the harmonious whole of her costume, her dress is one hue of blue, her bonnet another, with here and there several tints and shades all sounding a different key and so out of tune. A walk through any of our shops will reveal quantities of both cheap and expensive trash whose only reason to be is the popular demand for novelty. The uncultured classes both rich and poor live at an extravagant pace, and prefer show and display at the expense of good taste or comfort. Is there anything we can do in the schools to lay the foundation for something better, for lives and purposes honest and true? It is a solemn thought that the shaping of so many young lives is in our hands, for the mass of the children are in the public schools; these children are to become our citizens and through their childhood and during their school life one important function is not only to educate but in so doing to elevate.

We are all unconsciously building an American school of art. Purely national it may not be for a long time; good it will be, if artists, teachers, and industrial workers of all kinds, work for the best and put aside the bad. Let us recognize the humanizing influence of the beautiful, and strive for it, and be not overcome by the strictly useful and practical.

In our modern methods we reach the child through his senses. A young child springs toward a bright colored ball when such an object without color might pass unnoticed. This physical gladness which young children feel in the presence of color we may use to advantage in the early study of form. The use of color beyond the first years except to acquire a knowledge of its properties and its application in decorative design, must, it seems to me,

be restricted, on account of the difficulty of handling the medium, and the need of the power to draw, to see light and shade, and to express much in a few telling touches. What needs to go before really artistic expression of color from nature, is good training in drawing and modeling, with a knowledge of light, and shade, all leading up to the intelligent use of color in the really artistic sense.

There is another and important reason why children should at least know one color from another. We are told on the best of authority that color blindness is alarmingly prevalent. I will spare you the statistics which you can easily look up for yourselves, but they are startling. This is significant however, that red and green are the colors which the color blind most readily fail to distinguish; yet it so happens that these are the two colors most used for signals on railroads and ships. The cause of color blindness is in dispute, there being no apparent difference between the eyes of those who readily detect colors and those who are color blind. One thing is evident that the study of color is a possible means of developing a weak or latent color sense. With the little ones there are many ways of making the study delightful and instructive, as matching bits of woolen cloth and skeins of worsted, colored papers, silk and so on, taking great care that the color is taught before the color-name; as children who are really color blind have been known to associate the name with some special spot on a color chart, or form of material without really recognizing the color by the color sense. In order to have the same sense impressions repeated sufficiently for them to become fixed facts in the mind of the child, it seems well to deal for some time—certainly in their paper folding and cutting—with the primary colors only, and before I suggest certain ways of taking up such exercises let us consider for a little what we mean by primary colors. The scientists and artists sometimes differ in their statements as to what colors

shall be called primary. Some scientists show that red, green, and violet, are the primary colors in the spectrum; the other colors orange, yellow, and blue being made by their combination. Artists dealing with pigments find that they cannot produce yellow, red, or blue by the union of any other colors and that green, orange, and violet or purple may be made by uniting two of these first named pigments. So they decide that yellow, red, and blue are the primary colors. From these conclusions we are forced to acknowledge a spectrum basis of color, and a pigment basis. Again, there are those who contend that the primary colors are yellow, red, and blue both in the spectrum, and with pigments, and reason the subject out on this basis. In the spectrum or rainbow we see seven colors; violet and indigo being hues of blue, we can reduce the spectrum to violet, blue, green, yellow, orange, and red. As the orange comes midway between yellow and red, the green between yellow and blue, and the violet which is beside the blue partakes of the red, it may be assumed that orange is formed by a combination of red and yellow rays of light, green by rays of yellow and blue, and purple or violet by rays of blue and red. By this reasoning yellow, red, and blue are proved to be primary colors even in the spectrum. They are surely so in pigments, and as we cannot imprison the sunbeam or revel in the living colors of the sunset, we must do the best we can with the means we have at hand.

From the first we shall have to contend with the disadvantage that none of the pigments are perfectly pure, for while the union of the spectrum colors of yellow, red, and blue produces white light, the same combination with paints gives us only gray, light or dark, according to intensity.

In the school-room, for practical use and dealing with water colors, the best paints to use are gamboge, carmine, and Prussian blue with Payne's gray or neutral tint, to

make shades or dulled colors. These paints work freely, mix well and are not expensive. The proportion which the primaries bear to each other is said to be as three of yellow, five of red, and eight of blue, and we see the three primary colors either in their purity or in combination in everything we look at, which accounts in a way for the harmony of complementaries. If we look at a yellow object, such as a yellow vase or yellow drapery, we really see an effect of purple or violet in the surroundings. It is of course delicate and subtile, we may not even be conscious of it. The reason for this is that the retina of the eye becomes weary of one color and the other two primaries, red and blue, are seen in combination as a purple or violet hue which is cast in the shadows of the drapery or on some object adjacent to the vase. This may be proved to children by the coloring of discs and observing the halo which finally appears about the disc. In dealing with paints or colored papers, complementaries, such as purple and yellow, red and green, or blue and orange, are too strong in contrast to be put directly together. The effect is too harsh. It is true that they enhance each other, but except in tints or when modified by softening separations and surroundings they should not be placed in juxtaposition. It may be said, the rose is surrounded by green, oranges with their glossy leaves stand out against the deep blue of a tropical sky. This is true, but the rose is not seen as pure red, or the leaves as pure green; the rose is modified by its light and shade, the influence of its surroundings, and by the gray of the atmosphere. Green leaves are very gray in their high lights and the shadows which are nearest to the strongest green are seen broken by bits of red, invisible perhaps to the untrained eye yet always present to the careful observer. Secondary colors are those derived from the combination of two primaries. This it is well to illustrate before the children with paints and glasses of water, or

better still the children may mix the colors and produce the results themselves. Blue and red for instance will make purple, leaving yellow, which being the remaining primary color is accordingly complementary to purple. Assuming the pigment basis always, orange, green and purple are the secondaries. The tertiaries, citrine, russet and olive (by some called gray) are those produced by the union of any two of the secondaries. Orange and green, for example, make citrine. As orange is composed of the primaries, red and yellow, and green of blue and yellow it follows that in citrine there is an excess of yellow; consequently it demands its complementary, purple. Therefore purple is complementary to yellow and in strong contrast with it, and also complementary to citrine and in subdued contrast with it. Russet is formed by the mixture of orange and purple and as there is red in both of these secondaries, it follows that there is an excess of red in russet. So that russet is the subdued complementary of green. By the same reasoning, olive (which is so gray in tone as to be called gray by some authorities) harmonizes with orange.

These tertiary colors are the rich dull colors that we enjoy about us in home decorations such as wall-papers, draperies, carpets and the like. A bit of high color however here and there is necessary to enliven the general effect. Because tertiary colors are quiet and subdued, it does not follow that their exclusive use is desirable. Dark rooms gain much by light coloring in the decoration, and tints of tertiaries are often preferable to their full strength. An artistic sense of the fitness of things is so essential in house decoration that it is quite common at this time for those who feel that they have not had sufficient education in such matters to employ a professional decorator, who takes the matter entirely in charge, and, whether it be a room or the whole furnishing of a house, sees to it that the harmony is perfect throughout. There are those however,

ready to undertake such matters, who have little sense of beauty or fitness. "Dull colors are the fashion," they inform the customer. Straightway the change in the house begins. Much of the furniture is ebony, the wall paper is dark and all the fabrics dingy; a funereal gloom settles upon everything; the effect in fact is so depressing that the dissatisfied seeker after the æsthetic, while resigned to the situation, does hope that lively colors will be the fashion again soon.

It is affectation to admire nothing but fadè, or dulled colors, and reminds one of the expression of the young woman who undoubtedly pretended to more than she felt when asked "Is not that a lovely sunset?" answered, "Yes, but the coloring is crude." It is really much more difficult to make a good decorative design using primaries or even secondaries than to combine the subdued tertiary colors. Faults of proportion are more quickly recognized and the bright colors require great care in distribution and separation. In stained glass we get some lovely softened effects by the aid of the light which shines through. By the juxtaposition of red and blue for example the light softening and yet brightening the colors, a purple bloom results and great richness of effect. The nearer we can use color in its purity the better, but it takes a master hand to make the arrangement artistic and tasteful. Egyptians, Greeks, Arabs, and Moors used primary colors almost entirely during the earliest and best periods of their art. In the periods of decadence, red and green are found side by side where before were red and blue. In Pompeii every variety of shade and tone was employed but the bright colors were different and probably duller than the chemical colors of to-day.

In the High School (if not before) the study of Historic Ornament may include color, not only by the rendering of decorative designs of special periods but also in studying the people of those periods, their history and their

architecture. The Egyptians expressed color in a conventional manner. It was usually in flat tints and good examples may now be seen on some of the carefully preserved mummy cases. Many of their colors were very resinous which in part accounts for their remarkable preservation. There is interest and profit in the study of the art of any people, whether it be the efforts of the untutored savage or the expression of high poetic thought, with all the added advantage of technical excellence.

The perspective of color is sometimes made use of in decoration, so that certain impressions almost of relief may be produced. They are vague to be sure, and thus all the more charming. This is done by bringing forward the advancing colors and placing in the background the retreating. The advancing colors are red, orange, and yellow, and the blues the retreating. The ancients seemed to possess great knowledge of the resources of color and their mutual relations. The Chinese, while showing no real grandeur in any of their treatment, have the richest of coloring. This is also true of Japanese Art, which has more beauty and individuality than the Chinese.

There is much that we can work out in the theory of color, which is not only delightful and instructive in the doing but also helpful in decorative art and even in fine art, but we must never forget that color, with all its mystic influences, its subtile harmonies, and even discords cannot be sounded by plummet, nor can combinations at once agreeable to the sense and elevating to the mind be reduced to an algebraic formula. We find by experience not only in teaching but in art work generally that some knowledge of theory is of great value, but while accepting certain facts we must not forget that conditions modify them, and that in teaching color, as with many other things, there are exceptions to rules and various influences to be considered. Such are sunlight, light and shade, proximity of other colors, &c. &c., all of which have much

meaning. In our teaching of color in the public schools, water colors are cleaner and more easily handled than other color mediums, and more satisfactory in results. Both water colors and oils are greatly affected by their grinding. In old times every artist ground his own colors, or if he felt his time too precious the colors were ground by a boy in the studio. Many of the greatest artists began in this way as color grinders in some studio. The old masters kept their colors in pots and bladders and it was very hard to keep them fresh, and free from dirt. Oil colors come now prepared for use in compressible tubes of thin metal and so do water colors also, although the latter are more generally used in cakes or in porcelain pans. Moist colors, so called, have been mixed with glycerine. They take water easily, flow readily, and are generally preferred to the dry cakes.

In the teaching of color to young children and in using paints and colored papers (supplementary to the matching of colors in wool, silk, and so on) it seems well to begin with the standard primaries. The children thus recognize a standard or normal color as the intense color —as the yellowish yellow, reddish red, or bluish blue. They may then learn tint and shade and combine only tints, standards and shades of the same color. In dealing with water colors the addition of water or white will give a tint, and black or gray added to the standard will give a shade. In the use of paper there is still some difficulty in getting the most desirable colors; but this will be overcome doubtless when sufficient demand for harmonious combinations convinces the paper manufacturers of the need of care in reproducing an order exactly as it is given. In using water colors the paper which comes for the purpose is the best "Whatman's Rough" made into pads of convenient size; but a clear white manila with a rough surface will do, especially for class exercises. Work covering a large area, as a broad treatment of historic

ornament or a decorative design, requires water-color paper stretched upon a drawing-board.

We all admit that the young child is greatly attracted by color but just how far or in what way we can safely use this love of color in education is the question. It would seem best that only in his first efforts should the child express ideas of form from nature with color, for then technical excellence is not expected. He may again use color from nature as a culmination of his powers of expression both in artistic spirit and technique, reached after many years drill in drawing, with a knowledge of the theory of color, and practice in light and shade. Color would be present in the intervening period, however, not only as a source of delight but as a means of education, first in the use of colored paper, and later in that of water colors for decorative design.

Any child can daub green paint on paper and call it a leaf, or red and call it a rose, but true art is not imitation, even though the daubing be clever for the child's age. However, some bright and enterprising teachers are experimenting in that direction, and it is interesting to watch the effect. All I have seen makes me doubtful of the safety of such effort (that is, painting from objects and nature) beyond the first or second year of school life until the high school is reached. The old masters required of themselves and their students long and rigid drill in drawing and in light and shade before color was touched, save in the study of theory and for use in decorative effects. The expression by color was the culmination of this long study.

There may be educational value in attempting the exact imitation of a leaf or flower from nature rendered in color closely imitating every little part and used for illustration in the study of botany; or color may aid in showing structure in other scientific studies such as physiology, or physics, but such work, valuable though it may be, is not art.

The answer which is constantly made to one who pleads for good methods and higher artistic development in our public schools is, that "the school is no place to make an artist." Neither is it the place to spoil one. We can however excite an interest in art, do something toward developing the general taste of the community (which possibility we may hope for through the children) if results in the way of technical excellence are not demanded before it is reasonable to look for them. In no other civilized country in the world has the subject of art education been considered of such minor importance as in the United States. Year after year has gone by and our manufacturers have employed only foreign designers. Young artists have found no proper training short of the foreign schools. A spirit of progress is among us. Art schools are springing up all over the land. Native talent is developing and being recognized. Let the teachers by doing their little and doing it well, help in this movement, which is great in its possibilities, requiring only zeal and effort to insure success. My plea is for the children of the masses; that some feeling of beauty may enter their lives. It should be their inheritance. Who can measure its power for uplifting?

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THE CO-EDUCATION

OF

MIND AND HAND

BY

CHARLES H. HAM

Author of *Manual Training, Etc.*

JULY, 1890

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The Co-Education of Mind and Hand.

BY CHARLES H. HAM.

There is in each epoch of history a prominent question —a question that appears to dominate the time. But the question of questions in all epochs, the question that is really paramount, the question that most nearly concerns man in every relation of life, is education. For as the maker of the thing is good or bad, so is the thing made. It is therefore of the first importance to know exactly what education is. Frœbel says it is the harmonious growth of the whole being, and Pestalozzi declares that it is the generation of power. But surely he does not mean merely the power to think. He means rather the power to do—to act with intelligence and force; and the power so to act involves the healthful operation of all the faculties, physical, mental and moral. Education is, then, the development of all the powers of man to the culminating point of action—action in art, which is "power or skill in the use of knowledge; the practical application of the rules or principles of science." And this power in the concrete, the power to do some useful thing for man—this is the last analysis of educational truth.

"How to live" is, as Herbert Spencer says, "the great thing that education has to teach." And it is scarcely necessary to observe that neither words—signs of ideas, nor ideas—images in the mind—are substantial enough to support human life. Rousseau declares that "we ought to inculcate all we possibly can by actions, and to say only what we cannot do."

In the processes of education the idea should never be isolated from the object it represents. The object is the

material part, the body, of the idea; and without its body the idea is as impotent as the jet of steam that rises from the surface of boiling water and loses itself in the air. But unite it to its object and it becomes the vital spark, the animating force, the Promethean fire. Thus steam converts the Corliss Engine—a mass of lifeless iron—into a thing of beauty, of grace, and of resistless power.

Education and civilization are convertible terms; for civilization is the art of rendering life agreeable; and things —art products—constitute the basis of all the comforts and elegancies of civilized life. The great gulf between the savage and the civilized man is spanned by the seven hand tools; and the modern machine-shop is an aggregation of these tools driven by steam. Tools, then, constitute the great civilizing agency of the world. Carlyle well said of man: "without tools he is nothing, with tools he is all!" The savage may own a continent; but if he has only the savage's tools—the spear and the bow and arrow —he will be ill-fed, ill-clothed, and ill-housed. He might be familiar with philosophy and the sciences; but if he were ignorant of the useful arts his state would be the more deplorable, for, with the sensibilities and aspirations of a sage, he would still be powerless to draw from Heaven a spark of fire with which to warm his miserable hut!

It is not necessary to divide the arts by the employment of the terms "useful" and "fine;" for the fine arts so-called, can only exist legitimately where the useful arts have paved the way. In a harmonious development the artist will enter on the heels of the artisan. Art is one—a unit. It is not less worthily typified by the carpenter with his square, and the smith with his sledge, than by the sculptor with his mallet and chisel, and the painter with his easel and brush. Both classes contribute to the elevation of man.

It follows that the ultimate object of education is the

attainment of skill in the arts. To this end the speculations of philosophy and the experiments of chemistry lead. At the door of the study of the philosopher, and of the laboratory of the chemist, stands the artisan—listening for the newest hint philosophy can impart, waiting for the result of the latest chemical analysis. In his hands these suggestions take form. Through his skillful manipulations the faint tracings of science become real things, suited to the needs of human life. For it is through the arts alone that all branches of learning find expression. As Bacon so aptly said: "The real and legitimate goal of the sciences is the endowment of human life with new inventions and riches."

The complete separation of the schools from the arts in the early ages, resulted in such incongruities as the pyramids of Egypt and periodical famines; the hanging gardens of Babylon and the horrors of Jewish captivity; the Greek Parthenon and dwellings without chimneys; the statues of Praxiteles and Phidias, and royal banquets without knives, forks, or spoons; the Roman Forum and the Roman populace crying for bread and circuses.

Since, then, civilization is synonymous with education, and since the state of the arts is the true measure of civilization, the training that promotes the highest development of the arts must possess the greatest educational value. The use of tools quickens the intellect. The boy who begins to construct or form a machine, a tool, or anything, is compelled to think definitely, to deliberate, reason and conclude. As he advances he is brought into contact with powerful natural forces. If he would control those forces he must master their laws; he must hence investigate the phenomena of matter, and thence he will be led to a study of the phenomena of mind. Thus the training of the hand reacts upon the mind, inciting it to excursions into the realm of science in search of hidden laws and principles, to be utilized through the arts, in useful and beautiful things.

The error in prevailing methods of education consists in striving to reach the concrete by way of the abstract, whereas we should pursue a diametrically opposite course. If this proposition is sound, history ought to afford some confirmation of its verity. Let us look for it in the history of England:—Two hundred years ago the state of England was little better than one of savagery. The post-bags were carried on horse-back once a week; the highways were infested by robbers; one-fifth of the community were paupers; mechanics worked for from six pence to a shilling a day; executions were favorite public amusements, and the prisons were full. From this state of semi-savagery England has been raised to a measurably high degree of civilization. Her public works are the admiration of the world; she has vast hoarded wealth; her ships traverse every sea, bearing the commerce of every land, and her great manufactories are imposing monuments of inventive genius, industry, perseverance and skill.

To whom and to what is this material progress due—progress on a scale so colossal as by comparison to dwarf the achievements of all the earlier epochs of history? Not to statesmen and legislators; Buckle and Spencer show conclusively that the English legislator has been a hindrance rather than an aid to progress. Not to the schools; Spencer declares that, "If there had been no teaching but such as is given in the British public schools, England would now be what she was in feudal times." Not to her classic literature, richer though it is than that of Greece and Rome; literature is the flower, not the root, of national life; literature does not produce, but grows out of, material prosperity:—

"When Adam dolve, and Eve span,
Who was then the gentleman?"

It is, then, not to the men who make laws, nor to professional educators, nor to *litterateurs*, that England is indebted for the quality and extent of her civilization; but

to the men who make things—to the men who imprison steam and electricity and keep them at hard labor; to the men who make ploughs, sewing machines, locomotives and steamships; to the men who cultivate the soil, dig canals, build bridges, erect factories, construct harbors and docks, and cover the globe with tracks of steel, over which the world's vast commerce is borne. These beneficent material agencies alone render possible spiritual progress—that progress which is destined to find its ultimate in the brotherhood of man. In answer to the common charge against manual training, that it promotes gross materialism, I declare that there is more sentiment in things than in thoughts, more feeling in deeds than in words; and, hence, that the locomotive is a greater civilizer than Shakespeare. Says the poet:

"I'll put a girdle round about the earth in forty minutes."—

But when this fine phrase dropped from the pen of the writer the worker was deep in the struggle that eventuated in the steel track and wire over which Stephenson's engine and the electric current of Franklin now carry man and his messages round the world.

The history of England is to be found in the records, not of her universities, but of her workshops and farms. Her civilization was profoundly influenced by the persecuted artisans of France and Holland, who sought refuge on her shores; but was unaffected by the political refugees who found an asylum among her people.

The germs of nearly all the great inventions in mechanics, the fruit of which the world now enjoys in such ample measure, are directly traceable to the work-shops of England, during a period when she had no system of popular education. The apprentices in her shops were poor, obscure, and illiterate, at the start; but to those apprentices the honor of the great inventions and discoveries of that age is largely due. And in the struggle to invent tools and machines, to master the art of mechan-

ism, to steal from Nature her secret forces, and harness and use them for the good of man, the toiling workers often became highly educated—intellectual giants, familiar not alone with special studies, but masters of many branches of learning.

Mr. Samuel Smiles, in his lives of the engineers, and of the iron-workers and tool-makers, has shown us the true springs of English greatness. In telling the story of the struggles and triumphs of the British artisan he has unconsciously sketched the career of the real heroes of English progress. I say "unconsciously," because there is little or no evidence in the pages of Mr. Smiles, that he has anything like a true conception of the pre-eminence of the men, the story of whose humble lives he writes, as compared with the lawyers, legislators and *litterateurs* who, from being constantly in the public eye have come to receive a degree of consideration altogether out of proportion to their merit.

James Brindley, one of the most noted of those engineers, could neither spell correctly nor write legibly. He worked for two and sixpence a day, and long after his death his heirs sought in vain to recover his meagre wages. But he designed and constructed the first English canal—the canal that made the Manchester of to-day possible—and many other important British public works.

The life of Brindley is typical of the lives of scores of the early English engineers, inventors and discoverers, whose biographies are presented in Mr. Smiles' works. And the names of these men are the great names in English history. They are the names without which there would have been no English history! And the men who transformed the face of England from a desert waste to a fruitful field waving with golden grain, and through such transformation civilized the English people, were not ignorant. Ignorant men do not devise and construct canals, docks, harbors, railways and steamships.

But Mr. Gladstone once said of the leading mechanics of England, naming Brindley, Metcalf, Smeaton, Rennie and Telford; "These men who have now become famous among us, had no mechanics' institutes, no libraries, no classes, no examinations to cheer them on their way. In the greatest poverty, difficulties and discouragements, their energies were found sufficient for their work, and they have written their names in a distinguished page of the history of their country."

How then were the inventors, the discoverers, and the mechanics of England educated; I answer, through a combination of manual and mental training—the informing of the hand and mind by practice. They were educated by what Rousseau calls the natural method. They were made acquainted with "the visible and tangible properties of things," by seeing and handling them. Their power of observation were trained to that fineness and intensity of perception that goes by the name of genius—"a capacity for taking infinite pains." This is the explanation of the fact that the artisan has left the imprint of his cultured mind and trained hand on every part of the British Isles, while the acts of British statesmanship, scrawled irresolutely in the sand, with the pen of ignorance or of chicane, have been swept away, one after another, by rapidly recurring waves of popular discontent.

It will be a great day for man—the day that ushers in the dawn of more sober views of life, the day that inaugurates the era of the mastership of things in place of the mastership of words.

But what is the philosophy of manual training, the rationale of the new education? It is the union of thought and action. Theoretical knowledge is incomplete. An exclusively mental exercise merely teaches the pupil how to think, while the essential complement of thought is action. A purely mental acquirement is a theorem—something to be proved. Whether the given theorem is

susceptible of proof is always a question until the doubt is solved by the act of doing. Like thought and action the mind and hand complement each other. They are natural allies; the mind speculates; the hand tests the speculations of the mind by experiment. The hand thus explodes the errors of the mind; it inquires, by the act of doing, whether a given theorem is demonstrable in the form of a problem. The hand, therefore not only searches after truth, but finds it. It is in things, and in things only that the truth is to be found. It is easy to juggle with words—to make the worse appear the better reason,—but a lie in the concrete is always hideous! It is thus that the hand becomes the guide as well as the agent of the mind. It is the mind's rudder, its balance-wheel. It is the mind's monitor; it constantly appeals to the mind, by its acts, to hew to the line let the chips fly where they may.

There is a philosophical explanation of the wisdom of the hand, and it is found in the existence of what is known as the muscular sense. The principle of this sense is that "there are distinct nerves of sensation and of motion, or volition, one set bearing messages from the body to the brain, and the other from the brain to the body." Sir Charles Bell declares that without this sixth sense "we could have no guidance of the frame;" that "we could not command our muscles in standing, far less in walking, leaping or running, had we not a perception of their condition previous to the exercise of the will." Through the muscular sense the hand influences the brain. It telegraphs that it is ready to grasp the sledge, or seize the pen, or touch the string of the violin, whereupon the brain wires back the divine gift of power. These messages to and fro are lightning-like flashes of intelligence which blend all the mental and physical powers, and inform and inspire the whole man with vital force.

Thought and speech must be incarnate in action or they are dead. The orator appeals to the people to strike for

their rights ; the people rend the air with shouts and subside into silence. The orator cries, "To arms!" Again the people shout and again become silent. The orator's thoughts are of carnage, his words of flames. But they are as dead as if never conceived or uttered, because no hand is raised to embody them in deeds !

Man would lose the power of speech if his words should cease to be realized in things. Connected thoughts are impossible without words, or signs of words, and words depend upon objects for their existence. Hence language has its origin not less in external objects than in the mind. Objects make impressions upon the mind through the senses, and words serve as the means of preserving a record of such impressions. If the mind should cease to receive impressions, language would no longer be required, since there would be nothing to express ; and the occasion for the use of language ceasing to exist, the power of speech would ultimately be lost. The power of speech then, depends chiefly upon the endless succession of fresh objects presented to the mind by the hand. These form both the subject and the occasion of speech. The principal changes in language grow out of fresh discoveries in science and new inventions in art. The advance of a state in the scale of civilization depends upon progress in the useful arts. Hence when a state ceases to advance, its language stagnates. In such a state there is no occasion for new words. If a constantly diminishing number of objects are presented to the mind speech becomes less and less necessary. If no new objects are presented no fresh impressions upon the mind are made, and speech degenerates into a mere iteration. If the hands cease to labor in the arts, cease to make things, cease to plant and to gather, the scope of speech is still further restricted—is confined, at last, to the expression of the wants of savages subsisting on the native fruits of forest and plain. It is clear that progress finds expression only in the concrete.

As words are essential to the processes of thought, so objects are essential to words or living speech. And as all objects made by man owe their existence to the hand it follows that the hand exerts an incalculable influence upon the mind, and so constitutes the most potent agency in the work of civilization.

The world moves very fast industrially, but very slow intellectually and morally. What we need more than better artisans is better men in what are termed the learned professions. Farmers and mechanics stand the test of scrutiny better than merchants. Civil engineers and architects are more competent in their professions than lawyers, judges and legislators. Why? Because the former classes are trained in things, while the education of the latter is confined to abstractions. It is notorious, for example, that the laws, in this country are not faithfully executed. What if, through the ignorance or indolence of farmers, there were such a failure of crops as there is of justice? We should all starve! Ninety-seven merchants in a hundred fail. What if ninety-seven buildings in a hundred should fall upon the heads of their occupants within a few months of their completion? Buckle's caustic remark that the best British laws are those by which existing laws are repealed is as true of the legislation of this country as of that of England. What if the incompetency of the legislator were paralleled by that of the machinist? That is to say: Suppose ninety-seven in every hundred locomotives should break down on the trial trip?

It is said that during a visit of the late German Emperor to a needle factory a workman begged a hair of his head, drilled an eye in it, threaded it and passed it back to William, who had expressed surprise that eyes could be drilled in the smaller sizes of needles. The story illustrates the extreme delicacy of modern mechanical operations. It is not pretended, however, that the hand is a

nicer organ than the brain. It is not essential to the present purpose to discuss the relative importance of the respective functions exerted in the work of drilling the eye in the hair—that of the brain and that of the hand. Let us assume that the brain directs the hand autocratically. But why does it succeed so admirably when it employs the hand to execute its will, but so ill, when it devises and attempts itself to execute? How is it that the mind invents a watch, which being made by the hand records the hour to a second, ninety-seven times in a hundred, but fails ninety-seven times in a hundred, to devise and carry into successful execution a mercantile venture?

How is it that the mind invents a steam-engine, which being made by the hand, performs its work with perfect accuracy ninety-seven times in a hundred, but when it grapples with law and fact in the chair of counsel or judge produces a pitiful wreck of justice.

How is it that the mind devises, and the hand executes with such nice adaptation of means to the end in view, a bridge that resembles a spider's web, and yet bears thousands of tons and endures for ages, but when it undertakes to legislate evolves statutes so poor that they wear out in a year, or so unjust that their repeal is imperatively demanded?

The hand seems to work better under the guidance of the mind, than the mind works without the guidance of the hand. But it will be said that the explanation of the greater apparent accuracy of the work of the hand is to be found in the fact that it operates upon matter, while the mind deals with metaphysical subtilties. The contention is not that mind is less plastic than matter, but that it is more difficult of comprehension. But how do we know that this is so? Where has the experiment been tried, of honest contact, mind with mind? It was not tried in Egypt, Greece or Rome. It is not on trial in any part of

the world, to-day. There is, hence, no place in which to seek evidence as to how mind would act upon mind, if treated honestly, as matter is treated by the hand. But if the quality of selfishness is eliminated there will be no difficulty in bringing all minds to an agreement as the parts of a watch are brought into harmonious and useful action. And it is through the hand, doubtless, that this beneficent union is destined to be effected; for, as the Ionic philosopher so well said, "The hand is the source of wisdom;" and wisdom is the power of discriminating between the true and the false.

So we come to the heart of the subject: for the great end of education is character; and to produce a symmetrical character the mind and the hand must complement each other; for "to know the truth it is necessary to do the truth."

The ancient civilizations perished because man retained the savage instinct of selfishness. Each individual sought his own interest in scorn of the interest of his fellows, and in the struggle society was convulsed and wrecked. It is obvious that selfishness is a savage instinct, not a rational attribute because it inevitably reacts distinctively upon civil society. Rectitude should, then, be the chief aim of education; for it is rectitude alone that will preserve the civil compact. The dogma of Plato, that "the useful arts are degrading," is the sum of ancient educational error. For it is through the useful arts that the mind is brought into intimate relations with things; and it is in things, and in things only, that we find truth. Ancient educational methods were purely subjective. The school curriculum consisted mainly of rhetoric and logic. The pupil was taught the art of speaking with propriety, elegance and force, and to deduce legitimate conclusions from assumed premises. In the school of logic there was no struggle to find truth; in the school of philosophy no respect for the evidence of the senses. Hence the duplicity of the Greek

orator, who eloquently harangued the jury while his client bargained with the court for the price of justice; and the Greek speculative philosopher who confounded his audience with the force of his unanswerable logic, and appealed to his inner consciousness in support of the soundness of his premises. Under this subjective system of education and philosophy Greece and Rome retrograded to a state of semi-savagery. Selfishnesss did its perfect work in resolving society into its original elements.

Subjective propositions have no relations to things, and hence are verifiable only through consciousness. They are therefore mere speculations, often ingenious, but always problematical. Subjective or purely mental processes promote selfishness because their effects flow inward; they relate wholly to self. All purely mental acquirements become a part of self and so remain, forever, unless transmuted into things through the agency of the hand. But manual exercises promote altruism because they are objective. Their effects flow outward; they relate, in a broad way, to the whole human race. The artist, the artisan and the scientists study the nature and relations of things; and in this investigation they forget self, because the struggle in search of truth engrosses all their powers. From the false they intuitively shrink. They can succeed only by finding the truth, and embodying it in some useful or beautiful thing, which shall contribute to the comfort or pleasure of man.

The more absorbing the struggle in search of truth the less room there is left in the mind for the vice of selfishness; and as selfishness recedes, justice assumes its appropriate place as the controlling element in human conduct. Nor is this a mere dream of optimism. For, if in his intercourse with his fellows, one man can be made to observe the golden rule, all men can be trained to rectitude. It is a question of education. If education is made universal and scientific, all men can be made honest.

The acceptance of truth as the law and guide of life is more natural than reliance upon the false. The reason why what is called heroism excites special admiration and wonder is this: The standards of public judgment have become so perverted by long custom in the abuse of truth that normal conduct appears strange! The hero is an honest man—that's all:

"Though love repine and reason chafe,
There comes a voice without reply;
'Tis man's perdition to be safe,
When for the truth he ought to die."

The gravest mistake of the schools is, their conception of education as a mere ornament, a polite accomplishment, rather than the development of all the powers of man to the culminating point of action. They have had in view speculation rather than achievement; scholarship rather than character; mastership rather than manhood. In their exclusive devotion to pure learning they have been utterly oblivious of the stubborn fact that all abstract thought is vain and profitless unless it finds expression in things. Disregard of this absolute law made Plato the contemner of manual labor. Blinded by the vision of a purely spiritual life he felt and expressed measureless contempt for the hands that ministered to his material wants, declaring all the useful arts to be degrading! Thus, equally on the sublime heights of philosophic meditation, and in the depths of the slave's despair was the brand of shame imprinted on the brow and hand of useful toil! And so, in the world's literature, ethics and education, is embalmed the world's judgment that labor is an evil; whereas it is plain that the effort to avoid labor is man's chief curse.

Rousseau declares that, "rich or poor, strong or weak, every idle citizen is a knave," and Carlyle characterizes the idle man as a monster. Work is the highest duty, not

of some, but of all, and the greatest of blessings, not to some, but to all;—

> "God did anoint thee with his odorous oil
> To wrestle, not to reign!"

Work is the law of life, and its binding force upon the individual increases with the progress of civilization. The savage must work or perish, and the civilized man must work or compel another to work for him; and it is this alternative proposition that molded, and still controls, with an iron hand, existing educational systems. We do not train men to be useful, but train them to make others useful. We assume the existence of class distinctions, and take measures to perpetuate them, by training men, not to work themselves, but to make others work for them. And this solecism in education is the more glaring, in a country like ours, whose organic law asserts the equal rights of man. But every great abuse, or ignorance, or superstition, has behind it a great cause, and the cause of this fundamental defect in our education dates back to Greece. The revival of learning was a revival of Greek methods, which grew out of a social system whose every attribute was the opposite of ours—a social system whose corner-stone was slavery, as the corner-stone of ours is liberty.

In Greece education was based on the philosophy of that age, which was contempt, equally of labor, the useful arts, and the masses of men. Its purpose was the training of a few as rulers, while the many were slaves inured to privation, and accustomed only to toil. But the race has made a vast progress—spanned a great gulf—while conservative educators have been content still to memorize and repeat the precepts of the ancients, forgetting the monition of Bacon, that we are their elders. The extent and character of this progress may be realized by contrasting Plato's contemptuous dogma in regard to the useful arts, with Locke's famous apostrophe to iron,—the one

represents the inconsequential nature of abstract speculation, the other the solid ground of inductive philosophy.

It may be said that the fundamental law of education —mind growth—is the same everywhere and under all circumstances. True. But it is also true (though not yet generally admitted) that work, mental and manual combined (and there can be no manual exercise without mental effort) is the most potent of educational forces. And of the truth of this proposition the extremes of art afford a striking illustration; on the one hand, through the experience in the goldsmith's shops, of the early great Italian painters and sculptors, whose fingers were there disciplined to skill, and on the other, in the lives and works of the world's distinguished mechanics, notably the life and work of George Stephenson, who, at twenty years of age could neither read or write, but at fifty had compassed more good for man than all the soldiers, statesmen and scholars of his time.

Let us examine, briefly, the question of the educational value of hand-training in the light of authority:

Says Rabelais:

"Teach through the senses; inculcate independence of thought; train for practical life; develop mind and body equally."

And Montaigne:

"We toil to stuff the memory, but leave the conscience and understanding unfurnished and void."

And Bacon:

"Education is the cultivation of a just and legitimate familiarity betwixt the mind and things."

And Comenius:

"Schools have been fitly called the workshops of humanity."

And Rousseau:

"Reflect that the student will learn more by one hour of manual labor than he will retain from a whole day's

verbal instructions. The things themselves are the best explanations."

And Pestalozzi:

"Man must seek his chief instruction in his chief work, and not allow the empty teaching of the head to precede the labor of the hand. * * * We have to thank the nonsense with which our children's early years are diverted from labor and directed toward books, for a world full of blockheads."

And Frœbel:

"For what man tries to represent or do he begins to understand."

And Carlyle:

"All speech and rumor is short-lived, foolish, and untrue. Genuine work alone, what thou workest faithfully, that is eternal as the Almighty Founder and world builder himself."

And Prof. Huxley:

"Zoölogy cannot be learned with any degree of sufficiency unless the student practices dissection."

And Herbert Spencer:

"Science is organized knowledge; and before knowledge can be organized some of it must first be possessed. Every study, therefore, should have a purely experimental introduction; and only after an ample fund of observations has been accumulated should reasoning begin."

And Dr. Henry Maudsley:

"To know the truth it is necessary to do the truth."

And Mr. Ruskin:

"Let the youth once learn to take a straight shaving off a plank, or draw a fine curve without faltering, or lay a brick level in its mortar and he has learned a multitude of other matters which no lips of man could ever teach him."

These emphatic opinions of great teachers, scientists and philosophers, in support of the educational principles which underlie drawing, object lessons, constructive exercises and laboratory processes of every description, cannot be whistled down the wind. They are the deductions of

scientific research, the fruitage of an intimate acquaintance with the laws of psychology, the embodiment of the wisdom of the ages. In the rich realms of literature, science and philosophy, the names of these men are pre-eminent. The dead among them, departing, left few peers behind; and the living—proud distinction!—receive the homage of a grateful world, which venerates them while it enjoys the royal bounty of their genius.

Two great causes have combined to make manual labor repulsive. (1) The fact that, until recently, only slaves and persons of inferior social station worked with their hands, and (2) the idea which grew out of this fact that hand-work is in itself degrading. This false sentiment, which has the sanction of a philosopher venerated by all extreme classicists, must be abandoned. It must give way because it has no legitimate place in the existing social order. It was always a solecism; but in a civilization rendered brilliant by a thousand manifestations of the useful and beautiful in art it is an insult to industry, talent and genius—the triple power that moves the modern world. And this power must be recognized in the schools; aye, must control them. Labor alone is fundamental. We do not live by literature. The philosopher may cease to speculate, the poet to sing, the lawyer to plead, the priest to warn, the doctor to heal, and the world, with all its multiform concerns, goes on. But let the hand of labor be unlifted and there ensues an unfruitful pause. Silence in the field, the factory and the shop, means want, equally in the palace and the hut. And shall not the hand, whose cunning feeds, clothes, houses and warms the whole human race—shall it not be trained?

A studied effort is now being made by the would-be taskmasters of mankind, to re-enslave the laborer by treating his labor as if it were a mere commodity. But, while labor may be contracted for, it is not a commodity, because its delivery cannot be enforced. It is not a com-

modity because no power can reduce it to possession in the hands of the alleged purchaser. It is not a commodity, because, notwithstanding the debtor may possess fifty years store of it, not the smallest part can be extorted by legal process. It is not a commodity because it is a spark of divinity—man's sole creative attribute! As Carlyle well says, "It is the truest emblem of God, and the predestined ruler of the Earth." Work, then, being divine, is a worthy foundation on which to build. There is reasonable ground of hope, too, that education, based on work, will prove to be real character-building, rather than an encouragement of the spirit and habitude of diletanttism.

But, is there room for the workshop, as manual training is contemptuously called, in the common school, for its educational value? This is the most momentous question that ever disturbed the sleep of the conservative! It is a question that had to wait on the procession of the ages. It had no place in the nations of antiquity. It could not have been heard above the clank of slavery's chains. It would have been drowned by the cries that ascended from human prison-pens and auction blocks. The ruler by right of prescription who should have heard it would have felt his throne tremble beneath him. It is a question that threatens the very existence of every vested wrong, the stability of every chartered injustice, the tenure of power of every usurper of the divine right of man to rule over himself. The answer to it involves a revolution that shall end only in the regeneration of the race—in the rehabilitation of *all men* and all women in those sacred vestments of learning in which the early sages so proudly wrapped themselves to the exclusion of "the vulgar masses!" The answer to it is the negation of the senseless dogma of Plato that the useful arts are degrading, and the affirmation of the sublime postulate that the higher the use the greater the beauty. What a vast advance it involves from the Greek conception of beauty—sensuous and enervating

—to that of the present age, which finds its ideal in the mental, moral, and physical elevation, not of a class, but of the mass, of men, and so discerns, in things of use the highest excellence. The question had to wait for this time and this country—for a time and a country when and where men begin to think deeply of the flagrant injustice of permitting even *one* child to grow to manhood or womanhood, in ignorance. It had to wait for the idea of universal education, for the era of science, and for such an expansion of the arts as to render a mere knowledge of letters the poorest possible equipment for the real duties of life.

Nothing is more rational than that a complete social revolution should involve a radical change in methods of education. "It would be," as Bacon says, "an unsound fancy and self-contradictory, to expect that things which have never yet been done, can be done except by means which have never yet been tried." In the world of the future, which is to be controlled by science, *all* men and women must be educated; and it is obvious that *all* are not to be educated by educating a part. The theory that the legitimate purpose of our schools is the development of "Directive Intelligences" is essentially Greek. It is as alien to the thought and life of this age as the idea of the Greek custom of exposing infants, is shocking to the acute and tender sensibilities of the modern mind. This theory was exploded by Columbus when he landed on the new continent; by Luther when he burned the Pope's bull; by Montaigne when he satirized the Universities and sneered at the syllogism; by Bacon when he discarded the Aristotelian abstract philosophy, and enthroned induction as the Key to Knowledge; by every man who has wrested from Nature a secret be it ever so small, and made it the heritage of the human race.

This theory of "Directive Intelligences" belongs to the era of slavery, to a time when the useful arts were almost

unknown, and wholly despised ; to a time when there was scarcely any acquaintance with applied science ; to a time when idleness was esteemed a virtue and labor a shame and disgrace! But slavery has been banished from all highly civilized communities, and this emancipation of man renders necessary a new system of education. The purpose of education now is to enable the individual to exert and direct, not another's, but his own mental, moral, and physical powers. In the new world that is being developed by science and art, labor will be the universal law. In it no man will be trained to direct others to work, but all will be required to put their own hands to the plough.

Scorn of labor, and contempt of childhood, combined to rob the old educational systems of all moral force. It is in kindergarten and other manual exercises that the educational ethical principle resides ; and it is, hence, only in schools devoted to the co-education of the mind and hand that true christianity—the religion of humanity—is to be vitalized for the redemption of man. In the school of the future, childhood will be respected, nay, venerated, and labor will be honored.

It is amazing that it should never have occurred to educators that it is a great waste of energy to train *one* man to direct *another* man to do that which he is, himself, equally capable of doing. But a very famous schoolmaster declares that it is because the members of his profession will not stoop. He says: "The more we reflect on the method of Comenius the more shall we see that it is replete with suggestiveness, and we shall feel surprised that so much wisdom can have lain in the path of schoolmasters for two hundred and fifty years, and that they have never stooped to avail themselves of its treasures."

The fundamental educational principle of Comenius is that, "we learn to do by doing." A victim of the schools

of his time, he thus describes them:

"They are the terror of boys, and the slaughter-houses of minds—places where a hatred of literature and books is contracted, where ten or more years are spent in learning what might be acquired in one, where what ought to be poured in gently, is violently forced in, and beaten in, where what ought to be put clearly and perspicuously is presented in a confused and intricate way, as if it were a collection of puzzles—places where minds are fed on words."

The grave nature of the defects which characterize the schools of the present time may be inferred from the declaration of one of the most justly distinguished educators in the United States, that, "There has been very little change in the ideas which have controlled our methods of education, and these ideas were formed something like four hundred years ago."

What is now called the new education was formulated by the good Moravian Bishop, Comenius, and his method is disclosed in the following brief epigrams:—

(1) "Let everything be communicated through the senses, and turned to present use.

(2) Let nothing be prescribed as a memory-task that has not previously been thoroughly understood.

(3) Leave nothing, until it has been impressed by means of the ear, the eye, the tongue, the hand.

(4) Let nothing be learned by authority, but by demonstration sensible or national.

(5) Above all, never teach words without things, even in the vernacular, and whatever the pupils see, hear, taste, or touch, let them name. The tongue and the intelligence should advance on parallel lines.

(6) For the beginning of knowledge is from pure sense, not from words; and truth and certitude are testified to by the evidence of the senses. The senses are the most faithful stewards of the memory.

(7) Mechanics and artists do not teach their apprentices by disquisitions, but by giving them something to do.

(8) The study of languages should run parallel with the study of things; especially in youth, for we desire to form men, not parrots.

(9) As human nature rejoices in *doing*, everything should be learned by practice; and the utility and bearing of what is learned should be made manifest.

(10) *We* do not speak to our pupils, but *the things themselves;* and everything should be taught by the things themselves, or where these fail by accurate representations of them."

This epitome of Comenius' method contains the germ of all that the educational reformers of to-day are seeking to engraft upon the common school system; and it shows Comenius to have been a student both of nature and man—a philosopher of a high order. He was not a mere book-maker, although he made many books, nor a mere pedagogue, although justly proud of his profession of teacher, but an enthusiast and a lover of mankind, whose name is worthy a place by the side of those of the later great apostles of justice—Mazzini, Carlyle, and Ruskin. He was not only far in advance of the age in which he lived, but in advance of the great body of the educators of our own time. For he favored universal education, not in a perfunctory way, but boldly declaring that such training ought to cover the entire period, from birth to manhood.

If the schoolmaster of the seventeenth century could have "stooped" to avail himself of the ideas of Comenius, the question under consideration here would have been answered, in the affirmative more than a hundred years ago. Yes, there is room for the workshop in the common school, for its educational value. We shall not quarrel about terms, or mere definitions. I prefer the term laboratory; so does Dr. Runkle, the founder of manual training in this country. In a letter [to me, in 1884] he gives the following admirable definition of the phrase manual training:—"my first work was to build up, at the institute, a series of mechanic art shops, or laboratories to teach these arts, just as we teach chemistry and physics by the same means. At the same time I believed that this discipline could be made a part of general education just as we

make the sciences available for the same end through laboratory instruction."

But I have no objection to the term "workshop." One of the definitions of the word "laboratory" is, "the workroom of a chemist." Both the workshop and the laboratory are places in which to work. One of the definitions of "work" is "labor," and labor is the fundamental of fundamentals! Civilization and art are terms of equivalent import, and labor is the foundation of the arts. Hence the entire social fabric rests upon labor, and manual training is its science. Labor, then being the law of life, its principles and practice should be taught exhaustively in all schools. The school that does not do this is not worthy the name it bears; for as it is the duty of all to work, it is the right of all to be thoroughly grounded in the principles and exercises of work.

The workshop, or laboratory, in the school, is merely an extension of the principle of object-teaching, the high educational value of which is no longer questioned, and of which Oscar Browning so well says:

"This method of object-teaching is perhaps the greatest service which the naturalistic school has rendered to the cause of education. Hinted at by Rabelais and Locke, still more largely developed by Rousseau, it has received, in the last century, a more accurate and scientific form, and is probably destined to become the source of a new curriculum, in which literature will only hold a secondary place."

Mr. Browning is a very high authority. It is from the classic shades of Cambridge and Eton that he pronounces the doom of mere literary culture; and with prophetic ken, points to the school of the future, as the school where things are to take the place of words, where science and art are to hold the ground hitherto occupied by letters.

But what evidence is there that the training of the hand reacts educationally upon the mind? And this

question is asked in all seriousness, doubtless, by those who have hands! It is incomprehensible to me how there can exist in any mind a rational doubt that the hand is an instrument of incalculable educational power. The Greek philosopher, Anaxagoras, declared that "man is the wisest of animals because he has hands." We are the heritors of twenty-five hundred years of human experience since he lived, and yet fail to realize what so impressed him as to draw from his inspired lips an immortal sentiment.

The hand more than all other members of the body, differentiates man from the other animals. If it is a creation by *fiat*, what wisdom devised it! If it is the evolution of time, what unnumbered ages, and what mighty struggles contributed to its development! It raised the pyramids, stone upon stone, and planted the Sphinx in the pathway of the drifting sands of the desert. Who can look upon the one or the other, without a feeling of reverence, not only for the mind that planned but for the hand that executed works of such magnitude and grandeur! I never look at the Chicago Auditorium, now in process of construction, without a deep and grateful sense of an expanding mental horizon—of a clearer mental vision; and the assumption that the colossal structure which so stirs and exalts me, exerts no influence upon the minds of the thousands of workers engaged in its construction affronts the common intelligence! The difference between the slave who perished miserably under the walls of the pyramid where he toiled, and the intelligent free laborer of to-day, is as marked as that between the extremes of art, namely: the hatchet of the savage, and the locomotive of Stephenson. And this mental, moral, and physical progress of the laborer, is the measure of the influence of the hand, and its works, upon the mind. With his toil-stained hands the slave literally raised himself to the very gates of freedom, battered them

down and so entered upon the enjoyment of the common heritage of man. "Venerable to me," says Carlyle, "is the hard hand—crooked, coarse—wherein, notwithstanding lies a cunning virtue, indefeasibly royal, as of the sceptre of this planet."

If it be said that the hand is the mere blind instrument of the mind, I deny it, and insist that it is much more. "The end of man is an action, not a thought." The pen is an instrument; so is the axe, the sculptor's chisel, the painter's brush, and the carpenter's saw. But the hand is a sentient part of the man which bears the sacred impress of the deeds it has done. Let him who would degrade it to the level of a mere tool, look first at the back, and then at the palm of his own hand, and observe the contrast. Let him note how the sense of touch has illumined the palm with intelligence. How dull and frigid is the back of the hand—how alert and full of expression is the palm! The inside of the hand is inscribed with characters of living light. In it is recorded the history of a life—noble or ignoble! Here is refinement and sensibility; here a chapter knotted and gnarled by passion; or seamed by dishonor, or shimmering with the radiance of truth!

Touch is the master sense, and its pre-eminence in the hand imparts to it a wide experience, which renders it only less expressive than the face. In some of the works of Michael Angelo the hand is the dominant feature, giving character to the whole, and so challenging the attention usually engrossed by the face, and Mr. Ruskin calls attention to the significent fact that the fingers of the early great Italian masters of painting and sculpture were trained for their future art triumphs in the shops of the goldsmiths.

In the testimony of four pre-eminent men—Anaxagoras, Michael Angelo, Carlyle and Ruskin—we have an acknowledgement of the majesty, the cunning, and the

trustworthiness of the hand. But tributes of this character are as rare, in literature, as they are just. Nor is it strange that the hand has been held in almost universal contempt, when we reflect that to despise it has been, not only fashionable, but profitable. To wrestle with great thoughts upon condition that others should toil with their hands, in field, factory, mine and shop, has been a favorite pursuit since the lazy savage told stories by the camp-fire while his squaw ranged the forest in search of fagots to feed the flame. Numbers of "*brainy*" persons have been graciously willing to do the thinking for the rest of mankind, provided the rest of mankind would house them, clothe them, feed them and otherwise provide for all their physical wants. And it is worthy of note with what unanimity it has been agreed, among the "thinkers" that they ought to occupy all the fine houses, wear all the good clothes, and eat all the delicate food; and they are equally agreed that huts, rags, and corn-bread are good enough for the hand-worker. But it is none the less true as Ruskin so pertinently says, that: "Your wealth, your amusement, your pride, would all be alike impossible, but for those whom you scorn or forget. * * * The sailor wrestling with the sea's rage; the quiet student poring over his book or his vial; the common worker, without praise, and nearly without bread, fulfilling his task as your horses drag your carts, hopeless and spurned of all—these are the men by whom England lives!"

Nevertheless, it is for the "thinker," almost exclusively, and for the hand-worker not at all, that the schools have hitherto existed. But I declare, without fear of successful contradiction, that it is through the hand that man has spanned the great gulf between barbarism and civilization. And if this be true it is evidence enough of the educational value of manual training. But you dispute the proposition: You say, mind is the sole motive power of progress; that the hand unimpelled by mind is inert.

I deny nothing to the mind that you claim for it; but rejoin, pointing to the fact that mind alone is powerless to secure even one of the material conditions without thousands of which we should relapse into a state of barbarism in which state life would become intolerable. You declare, nevertheless, that the mind is the immortal part, an independent entity created to command, and the hand mere matter, its servant, to obey.

But suppose the mind is big with the thought of a locomotive, and commands the hand to construct one? And suppose further, that the hand is unskilled, untrained in the mysteries of the mechanic arts? It is as powerless to obey as if it were an inanimate clod; and the mind is as powerless to compel obedience as if *it* were a clod.

It is plain that there can be no material progress except through the co-operation of mind and hand. Each is educated by contact, through things, with the other; and this reciprocal relation may be illustrated through inventive processes. All inventions are growths, consisting of sequential steps. One inventor works at a given problem, and fails; but leaves behind him a hint, in wood or iron, which another comprehends and utilizes in a second step, but fails, also, of complete success, and so on. The steam engine was a growth of two thousand years—from Hero to Fulton and Watt. Huntsmen, whose steel held the field for more than a century, toiled in the realization of his idea over the crucible, for years, and evidence of his numerous failures was found in masses of metal, in various stages of imperfection, buried in the neighborhood of the cottage where he studied and wrought. But these seeming failures were the steps of success. The work of his hands reacted upon his mind leading it forward toward the goal, which could have been reached in no other way.

While employed in collieries as "fireman" and "plugman" Stephenson repaired the engines in his charge, taking them apart and putting them together. While so

engaged he learned to read and write, following the scientific method of acquiring a knowledge of words and things at the same time. These were the exercises, mental and manual, that led up to the Rocket—the wonderful machine that the bookish engineers of the time declared could not be made. What Stephenson learned mentally, in the night school, was complemented manually, in his day school, which consisted of exercises in repairing the engine in his care.

Watt's initial idea of the steam engine came from the model of an atmospheric machine of Newcomen's, placed in his hands for repairs. But before the time of Newcomen, Ducans, Papin, Savory, and Breighton, had worked at the great problem; and Newcomen's machine bore the noble impress of their minds and hands. In revealing to Watt the humble steps of the past, Newcomen's machine pointed the way to a glorious future; and it was through these inventive steps, shown in the concrete that he was able to realize all the dreams of those that had gone before, in his own transcendent achievement which moved Dr. Draper to declare that he "conferred on his native country more solid benefits than all the treaties she ever made, and all the battles she ever won."

To show how the hand supplements, or co-operates with, the mind, let us suppose a case as they do in the schools:—A mechanic strives to invent a machine—an engine. The thought or conception of it is in his mind. He has a mental vision of it, as it will appear when completed and vitalized by steam. He constructs it on the plan in his mind. It is finished, and steam is let into the cylinders. But it does not work,—the pistonrod does not move; the shaft is as lifeless as if it were but a lump of dingy ore in the mine. Or it flies in pieces, and the room is filled with hissing steam. In either event the machine is a failure. But the experiment is not hence valueless. On the contrary it is one of the steps of invention. For

the inventor now examines the inert mass of iron and steel or the wreck, as the case may be, and the cause of the failure, revealed in the concrete, becomes apparent. In a word the defective machine shows that there has been defective thinking; and, what is equally to the point, the defect suggests the remedy, showing that a lifeless piston-rod, or a broken cylinder-head has become the source of a new idea. And this, in turn, shows why the philosophical theories of the ancients were so often false—they were the product of abstract speculation:—It is better to refer knotty problems to the hand, than to the inner consciousness.

The creative faculty—that divinity in man—cannot be developed by poring over books, nor by abstract thought. Man is not a pure intellect. If he were he might fly away and be at rest. But he is bound to earth as Ixion to the wheel, and he must explore it, must master its secrets; and this can be done only by laboratory processes. Nature is the great book; induction is the law of investigation, and the hand is its chief minister.

I confess that it provokes me to indignation and moves me to scorn to be told that the great inventors—Fulton, Watt, Stephenson, Maudsley, Clement, Bessemer, Edison, and a hundred, nay, a thousand others—whose works render the world resplendent with beauty, and divine with use—it fills me with indignation to be told that these great men gained no intellectual or moral strength through contact with things, while wrestling with the intricate problems they solved.

The moral aspect of education as it at present exists in this country is by no means reassuring. It is evident that none of our educational institutions exert a high moral influence in the community. Our elementary schools not only do not make their pupils moral; they do not even promote common honesty. Of this fact there is abundant evidence: The number of criminals in the United States,

relatively to population, has doubled since 1850. The statistics of prisons show that five-sixths of their inmates are graduates of the common schools—public and private; that three-fourths of them are unskilled in the mechanic arts; that more than half of them were idlers at the time of their arrest; that young convicts who have been in the schools, but who have no trade knowledge, are increasing in number; that notwithstanding the vast expenditure for education, in the city of New York, there is a decline in the character and material prosperity of its people, as shown by the fact that taxation for purposes of penal, reformatory, and charitable institutions, has doubled in the last fifteen years. Nor is there any apparent moral or material gain to the pupil, if he continues his course through the higher schools, culminating in the university. In a letter, now before me, of recent date, Col. Ingersoll, with characteristic force, says:

"I agree with you perfectly that the hand and head must work together. Nothing excites my pity more than a man who has given fifteen or twenty years of his life to study—who is the graduate of a University and yet knows nothing of any importance—knows nothing that he can sell—knows nothing by which he can make a living. His poor head is stuffed with worthless knowledge—with declensions and conjugations—in other words he has spent his whole life learning the names of cards, and has not the slightest idea of a game."

Thus, equally ignorant of the real duties of life the boys of fourteen who leave the grammar school, and the men of eighteen to twenty-five who leave the high school and the university, become a charge upon society; for they must live by their wits, learn a trade, study a profession, or become idlers. Thousands of them do, in fact, become idle and vicious, and are sent to prison. In 1885-6, in a total of fifteen hundred inmates of the Joliet (Ill) Penitentiary every eleventh man had received a high school or college education.

The scholastic training of the race has been exclusively subjective, whereas it should have been both objective and subjective, and more objective than subjective. It is through subjectivity that man's moral sense has been put to sleep. The integrity of the mind can be maintained only by the submission of its immature judgments to the verification of things. This failing, all fails. Consciousness wearily revolving lifeless precepts quickly degenerates into automatism :—

"And thus the native hue of resolution
Is sicklied o'er with the pale cast of thought.
And enterprises of great pith and moment,
With this regard, their currents turn awry,
And lose the name of action."—

Hence the fact that man is nearly destitute of vital moral culture ; for morality consists not in words, but in deeds. Morality is use, and thought which does not eventuate in action is a barren ideality.

Of the absolute verity of the proposition that man is destitute of moral sense the attitude of the northern people, thirty-five years ago, toward slavery in the United States, affords an admirable illustration. Discussing the fugitive slave law in 1854, Mr. Emerson, with characteristic incisiveness, showed how all the civic virtues went down before greed ; showed how the churches, the universities and the statesmen (?) of the time apologized for, and even eulogized and apotheosized, slavery ; showed how scholars and literary men were lovers of liberty in far-away Greece and Rome, and in the English Commonwealth, but were lukewarm lovers of the liberty of America. Parker Pillsbury, too, in his "acts of the anti-slavery apostles," shows how all the social and church forces of the time were solidly arrayed against universal liberty, and how completely dead they were to moral impulses. It may be said that the American people were at last aroused. True. But it must not be forgotten that every effort was first

put orth to save the union *with* slavery; and that the emancipation proclamation was a war measure, not an act of justice.

The moral force of manual training rests in its objectivity. It deals with sense verities, not with indeterminate metaphysical subtleties. It subjects all propositions to the test of inductive inquiry; and as it operates in a realm of immutable laws it squares itself with them, harmonizes itself with Nature, and hence finds the truth as it exists in things and their relations.

Discussing the methods of partisans in the late Presidential campaign [1888] the Editor of the *Popular Science Monthly* says: "men made lies, and loved them; and other men loved to see the lies in circulation; and others loved to delude themselves with the lies so made and circulated; until it really seemed as if, throughout a considerable portion of the community, the one thing that everybody feared and hated was truth."

Whence comes this hatred of truth, which is a savage vice, and the sure evidence of the decay of civilization? Certainly from education, training, example, habit. Are not the schools then responsible? If it be said that the school is not the place to inculcate morals, I deny it, and insist, that, of all education character-building is preeminently important. Of what avail is all the learning of the schools without integrity! And integrity is but another name for morality. But morality is not an abstraction, and hence cannot be taught abstractly. It is rectitude, good conduct, right acting; and it can be taught only in the concrete—by doing. The reason of our moral unsoundness is the fact that we regard morality as a mere sentiment, a barren ideality—something to be talked about, not exemplified in our daily life,—"It is not enough to say prayers unless they *live* them too."

We call ourselves Christians, but we should not recognize Christ were he to knock at our doors. In a thousand

forms of sorrow, misery, and poverty, he appeals to us daily, and we turn away,--Inasmuch as ye have *not* done it unto one of the least of these, my brethren, ye have *not* done it unto me.

In the heart of Illinois, a state as fertile as the valley of the Nile, with a sparse population, and abounding in hoarded wealth, thousands of men, women and children were recently on the verge of starvation. Five hundred years ago famines came through failure of harvests and lack of transportation ; but now they occur because a few, with avaricious hand, seize all the garnered fruits of labor. That this indifference to suffering among large masses of fellow-creatures is not natural, however, but the result of vicious education is clear since the humane impulse to deliver suddenly imperilled life is instantaneous, universal and overwhelming. When the spectacle of poverty, or misery in any form shall prompt to saving action as definite and vigorous as the involuntary impulse to rescue the drowning man is natural and irresistible—then and not till then will the race have attained a high moral plane ; and this plane is to be reached only through education in things.

The only way to be moral is to be useful, and usefulness is learned only by doing. Obedience is the first moral lesson—not obedience to authority—" for truth is rightly named the daughter of time, not of authority "—but to law, the law of nature ; and real obedience—the absolute consent of the will—is learned only through things.

If all men have become liars, as Mr. Youmans insinuates, it is because they have been falsely educated. Morality is truth, and truth is the goal of scientific investigation. The man's moral power depends upon the development of his working capability ; and this is a function almost wholly neglected by the schools. On the other hand every law that governs the manipulation of iron, for example, is a moral lesson. Bessemer had to learn a

hundred such lessons before he could, by a breath of air, revolutionize the world with cheap steel. Electricity is hemmed in, on every side, by laws. Thousands of scientists are studying those laws, and, in the investigation, nothing but truth will serve. A lie in the chain of evidence is fatal to progress. If Edison is imposed upon by a false witness the phonograph is indefinitely postponed. As Daniel Webster so pertinently said:

"Truth is always congruous, and agrees with itself; every truth in the universe agrees with every other truth in the universe; whereas, falshoods not only disagree with truth, but usually quarrel among themselves."

The reason why the industrious mechanic is the most moral of men, is because his occupation brings him into intimate relations with the truth as it is found in things; it constantly enforces the law of obedience until it is crystalized in habit. He learns that all things, all forces, in nature, can be made the servants of man, that they will "become a path for his feet and give him wings," if he will but obey their laws. But these laws can be obeyed only by doing. Not vain talk, but honest work is the key to Nature's secrets. Hence Rousseau's scorn of the idler whom he characterizes as "no better than a thief," and Carlyle's hatred of him as "a monster."

Since, then, idleness is the vice of vices, leading to every folly and crime, and its antithesis, industry, is the virtue of virtues, crowning life with all use and beauty, it follows that the art and love of work are the main things to be taught in the schools. And if there is not room for this new branch of learning, let room be made!

The civilization of the future is to be controlled by science; and of science, experiment is the foundation. Induction is the magic wand with which spirits are conjured from earth and air, to bear the burdens of the race. The mists of the morning of time are clearing, and

the superstitions of man's childhood are vanishing away. Truth only is everlasting.

There was an age of stone; but the scientist toiling over his crucible, evolved bronze, and the stone age disappeared, leaving only some rude implements to tell the story of its struggles. Then steam was bound in iron bonds, and the earth trembled under the shock of the rushing railway train. But lo! Bessemer breathes upon the seething metal, and the iron age hardens into the age of steel. And so, science, under the impulse of steam and electricity, presses forward toward the age of aluminum—that shimmering white substance which is lighter than chalk and tenser than steel.

Man is indeed the wisest of animals because he has hands. With one hand he wrests from Nature her secret forces, and with the other molds them into forms of use and beauty adapted to all the needs of life. Thus the scientist and the artisan are the twin-ministers of human progress. It is in the works of their hands that man's history is found, and in no other language. All other records are inaccurate; in all other accounts there is room for deception; but the thing made is the truth, and there is no gainsaying it.

And, as in the past, so in the future, the scientist who discovers, and the artisan who utilizes—these two shall slowly raise man toward the ultimate of human aspiration. But every discovery, every invention, every forward and upward step, renders civilization more complex, and hence makes character more essential as the most precious fruit of education. And there is but one high road to character—unselfish industry. Idleness is hideous; work is sublime!

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HANDCRAFT

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PREFATORY NOTE.

At the request of several educationists the Editor takes great pleasure in printing in the EDUCATIONAL MONOGRAPHS, with the consent and approval of the author, the following paper on Handcraft which first appeared in the *National Review* for August, 1888. It is believed that Dr. Crichton-Browne's exposition of the physiological argument for Manual Training will be a valuable aid in the contemporary discussion of this educational problem. It is in some respects unfortunate that the author had not studied the effect of introducing constructive work in wood and iron into the schools of Sweden, France and the United States before reaching his conclusions as to that aspect of the question.

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Handcraft.

Whoever takes a comprehensive survey of England in these days, and notes the teeming masses in her cities and towns, the prolific multitudes scattered in her hamlets and cottages, and the increasing inadequacy of her fields, even when brought to their highest state of cultivation, to support their human burden, must soon realize the vital significance of the question, "Wherewithal shall we buy bread that these may eat?" And the obvious answer to that question, that the means to provide sustenance for this great company must be procured by exchanging for food the products of their industry, is scarcely calculated to allay the anxiety that it has conjured up, for we are told from many quarters that our industrial supremacy is on the wane, and that foreign nations are rapidly supplanting us in those markets where we have been wont to exchange for corn the fruits of our skill and labor. After the Paris Exhibition of 1867, the cry was first raised as to continental and American progress in engineering and manufactures, and since that time we have had to listen to an ever swelling chorus of voices warning us that we are losing our leading position in the race of races, and must redouble our efforts if we are to hold our own. Now it is, as far as we are concerned, unhappily too true, that several foreign countries have developed their manufactures in a remarkable way in recent times, and deprived us of some of the advantages which we formerly enjoyed in competing with them; but it is, I venture to say, not true that there has been, as we are often assured, any decadence in the ingenuity, intelligence, skill or perseverance of our working population, or that they have

failed, during the last twenty years, to advance as rapidly as any population in the world, in all the constructive and decorative arts.

The gloom and chilliness of that protracted depression of trade which has hung round our planet like a belt of Saturn for several years, but which may be dissipated any morning by a brisk trade wind—springing up no man knows where—the gloom and chilliness of this depression predisposes us to pessimistic views, and to give credence to statements which in brighter moments we would brush impatiently aside. And thus it is, I think, that even sagacious heads are shaken over statements like that of Mr. Oscar Browning, that we are every year losing ground in the race of industry to the better-trained foreigner, owing to our deplorable education, which prevents us at present from looking any foreigner in the face without a blush; or like that of Mr. Wilson, Head Master of Clifton College, that he came back from a visit to the continent with a feeling of humiliation, not unmixed with alarm, when he contrasted our condition and prospects with those of our industrial rivals; or like that of Mr. Felkin, that England is being robbed in detail of her industrial supremacy; or like that of Mr. Mundella, that everyone must know that what we have to contend with is the lack of technical instruction for our working classes.

The difficulties and dangers that beset our industrial position are serious enough, and the need of an improved system of technical education amongst us is indisputable; but our difficulties are not to be overcome by misconceiving their source, nor ought our wants to be supplied on an exaggerated estimate of the benefits that are to accrue from the improvements we desire. And that it is a misconception to suppose that our industrial embarrassments have arisen from any deterioration or diminished rate of progress in the abilities or energies of our working classes, or that they can be relieved by technical education

alone, however valuable that may be, I hope to be able to show. A rich and varied storehouse of facts bearing on the point at issue is to be found in the Report of the Royal Commission on Technical Instruction, and anyone who will take the trouble to ransack that storehouse through and through, as I have done, will, I think, arrive at the comforting conclusion that we have no occasion to feel humiliated or to go about Europe blushing when the skill of our artizans and fabricators is in question. The Commissioners, who were appointed specially to compare the industrial capabilities of our own people with those of other countries, may be assumed to have directed their attention more particularly to those industries in which comparison was most easy, and in which England is most closely pressed; and it is, therefore, highly reassuring to find that in almost every branch of industry the palm is unhesitatingly awarded to this country. Their visits to establishments on the Continent, their conversations with the most eminent authorities, and with work-people in every department of manufacture which they investigated, and the inquiries carried on for them by deputies, have all combined to convince the Commissioners that, taking the arts of construction and the staple manufactures as a whole, our people "still maintain their position at the head of the industrial world."

Let me quote the verdicts of the Commissioners, or of those whom they consulted, upon a few of the industries which they passed under review. "In the ironworks of Westphalia," they say, "it was admitted that England may fairly claim the pre-eminence of the world." "In cotton-spinning and weaving" in Belgium, they remark, "English machinery and models are adopted everywhere, and English competition is the despair of every mill-owner." In the engineering works at Chemnitz, they report, "the superiority of English over other tools was willingly acknowledged, while we satisfied ourselves that

the workmen there do not get through the same quantity of work that English workmen accomplish." In calico-printing, they conclude, "England still remains undoubted master." With reference to the textile manufactures of Saxony, they say, "Both yarns and pieces are generally in a better state after leaving the spinner and weaver in England than in Germany and France, while in the spinning of lustre, demi-lustre, and damask yarns, the manufacturers admitted that Bradford stands unrivalled." As regards the dyeing of mixed goods with cotton warp in the woollen industries of France, they intimate, "the French merchants are willing to admit the superiority of English dyers." In respect of the silk industries of Creffeld, they explain that "the manufacturers there are much less afraid of the future competition of France and Switzerland than of England. In power-loom weaving in particular, and in improvements in machinery, one English manufacturer has outstripped all rivals, and at the present time the honor of possessing the largest and probably the most successful silk factory in the world, belongs to a Yorkshire manufacturer." At the cotton-mill of MM. Henrich Kunz the Commissioners were assured by Mr. Hans Wunderly, whose judgment is entitled to the greatest weight, that the English are at the head of all the workmen he has ever seen, and he is familiar with those of France, Switzerland, Germany, and Italy. "For practical knowledge of their work and mechanical genius" they are, Mr. Wunderly declared, "better without technical education than continental workmen are with it, while for physical endurance and all-round capacity they know no rivals."

These extracts, taken at random from the second part of the Report, might have been multiplied indefinitely, but they are perhaps sufficient to establish that there is overwhelming evidence that the right hands of our workmen have not lost their cunning. One rises from the perusal

of the Report without blushing or humiliation, but with a feeling of just pride that the inhabitants of this little island should still so manifestly excel in so many and such diverse pursuits. Each country on the Continent of Europe has some one particular star of industry, by which it is distinguished, but this country has a whole galaxy to boast of. And, indeed, our own experience in little matters leads us to the same conclusion as the Commissioners on Technical Education, for if we want a really good watch, a trustworthy and lasting timekeeper, we ask for one of English make, the Ecole Horlogerie of Besançon notwithstanding; and if we want a pair of gloves that will fit and hold together, we look for a big D on the buttons, and prefer that as a guarantee to any French or Saxony trade-mark.

But while the Report of the Technical Commissioners affords not a tittle of evidence that there has been in England any decline or fall in the dexterity, ingenuity, or productiveness of our work-people, of any class, it supplies abundant confirmation of the statement, often repeated and now painfully brought home to many of us, that there has been an enormous development of manufacturing power on the Continent in various branches of industry in the last quarter of a century, and that our markets are being encroached on and taken from us by rivals, who, if they do not equal us in skill yet surpass us in the cheapness of the commodities which they produce, and in their persistent energy in forcing these upon the markets. Everywhere on the Continent we hear of the establishment of new works and mills, or of the extension of old ones, and of endeavors to undersell England and oust her from markets of which she formerly held exclusive possession. Vast strides have been made by France Germany, and Switzerland in the exportation of manufactured goods of many kinds, which England at one time supplied to all who wanted them, and the utmost

activity prevails in these countries in pushing their trade and diminishing the cost of their productions.

Now if we inquire how it is that England with unreduced skill and energy and command of capital is suffering so severely in the competition that is going on, we come upon several explanations. Many of what ought to be our greediest markets are closed to us by foreign tariffs, while foreign operatives are content to work for far longer hours, and for far lower wages, than our own. Then foreign manufactures are not hampered to the same degree with English ones, by restrictive Factory Acts and regulations as to the employment of children, nor are they embarrassed as much by the dictation of trades unions, nor do they on the whole suffer as much from time-breaking through drink. Railway rates, again, are sometimes in favor of the foreign manufacturer as against his English opponent, while in mountainous districts on the Continent cheap power is obtained, in a way denied to England, by the abundant water-supply utilized for motive purposes by turbines. But of all the causes which have contributed to the success of continental countries in their industrial attacks on England the most potent has perhaps been the unstinted introduction into them of English machinery, and of trained English instructors. When steam-engines were first introduced, and for years afterwards, England was fortunately situated in having abundant supplies of coal and iron, a clever set of handicraftsmen, and ample capital, advantages not shared by the rest of the world. The natural result was that the multiplied production of the machine, combined with the excellence and increased cheapness of the product, enabled her to compete everywhere with all comers. Hence the very large profits made in the early days of machinery, when the foundation of the prosperity of the principal northern manufacturing towns and firms was laid. "The nation most happily placed for taking advantage of

steam naturally reaped a great harvest, but as the use of steam superseding human labor has spread, and as machinery for the utilization of steam has been acquired by continental countries, the primary and exceptional advantages of England have shrunk." The fact is, that England has been long busily engaged in distributing over the Continent weapons with which she is now herself assailed; and go where you will, you now find the most perfect creations of English hands doing their best to steal the bread from English mouths. Nearly all the cotton-spinning machinery in France, Belgium, and the Rhine provinces, has been imported from England. The wool-combing establishments of France are furnished with splendid machinery and engines from England, and so are the woolen factories of Belgium and Italy. In textile factories everywhere looms from Bradford and Keighley are found at work, and in hosiery factories also English machinery abounds. In engineering and steel and iron works in Belgium, Switzerland, and Germany, English tools and machinery are extensively employed. In every corner of Europe where industry has raised its head, the mechanical slaves of England are toiling for foreign masters, and not only so, but English men as well as machines are found enlisted in the campaign against the mother country. Several essentially English industries have been transplanted to the Continent by colonies of English operatives, who have been induced to take up their abode there, and English managers, foremen, superintendents, engineers, and mechanics have been chiefly instrumental in developing, and are largely employed in directing many kinds of manufacture in every part of Europe. But here we come upon indications of the effects of the higher scientific and technical education which is now being zealously carried on in many Continental States, for the evidence is clear that English managers and foremen are not now as frequently employed on the

continent as they formerly were. The theoretical instruction in the scientific principles applicable to trade and the practical training afforded in polytechnic schools, insure now an ample supply of persons competent to become heads of departments, capable of anticipating results, of calculating beforehand the quantity and quality of materials required, of originating new methods, and of meeting contingencies. English foremen and superintendents are therefore not in such request as they once were. The opinion of the well-informed seems to be all but unanimous that technical training is of the first importance to those who are to take a leading and controlling part in works, and especially in works connected with chemical industries, but opinion seems to be almost equally unanimous that technical instruction may very well stop here, and that it is not necessary or desirable for the lower strata of the toiling masses. Leaving out of view at present the beneficial influence of various subjects, scientific and practical, included under technical education as recreative and elevating pursuits, it is of interest to note that all over Europe those who know most of large industrial concerns put a strict limit to what technical education can accomplish, and do not expect from it any improvement in the skill or fertility of the general body of workpeople. That the marked superiority of England in manufactures hitherto has been in no way attributable to technical education, will be obvious when it is remembered that the great complaint against us is that we have neglected this, in comparison with our neighbors, and that the remarkable advances in manufacturing prosperity achieved by our neighbors cannot justly be ascribed to it, becomes clear when it is demonstrated that this may almost invariably be traced in each particular case to some other cause. In many instances we find the Technical Commissioners themselves guarding against exaggerated notions as to what this special education has done or can

do. "In France," they observe, "as in other countries, we did not receive any evidence that technical schools have been of advantage to spinning or weaving." "If the hosiery and glove manufactures of Chemnitz," they remark, "are taking a strong position, this appears to be due to other conditions and not to the influence of technical education." "In the silk industries of Rhenish Prussia," they add, "it was represented that theoretical knowledge would be a drawback to the workers." One of the chief engineers of Saxony discredited technical schools to the Commissioners, because they subordinate the practical to the theoretical, and Dr. Siemens told them that there are more polytechnic schools in Germany than are necessary.

And here the question may properly be asked, What are the conditions, then, which have favored the industrial superiority which this country has so long enjoyed? If technical education is of value only to the pioneers, what is it that has made the great army of workers capable of following their lead? What is it, and this is really the supreme question for us, that in the absence of technical education has enabled the English nation to assume a commanding position in most of the fields of industry which it has entered, and that must receive attention if that commanding position is to be maintained? We have already in part answered this question when adverting to the advantages of England's geographical position, and of her mineral wealth, but other factors have contributed in no mean degree to her industrial supremacy, and to these I would direct attention. They consist in (1) the characteristics of the race, (2) the good health of the people, (3) their inherited skill, (4) the early training of their hands.

The characteristics of the Anglo-Saxon race, which in its westward migrations gave it victory over feebler tribes, have availed it in its industrial conflicts not less than in

its territorial wars, and given it possession of many of the most fruitful portions of the earth's surface, thus enabling it to secure for itself that ample supply of food which is essential to good physical development and sound health. And good physical development and sound health have again nourished the spirit of enterprise, enabled the Anglo-Saxon race to extend its dominion, and played a far larger part than is often appreciated in the establishment of that commercial and industrial supremacy which it has heretofore enjoyed. It is not insular vanity, but scientific truth, to say that the English prople excel all other European peoples at this day in bodily development and health. In height, weight, and chest girth any large number of Englishmen will give a higher average than an equal number of Frenchmen, Germans, or Belgians. Army returns relating to conscripts and recruits, vital statistics dealing with the mortality of large towns, and the results of investigations as to the relative prevalence of certain forms of disease, put it beyond cavil that the standard of health is higher with us than in other countries, and that we are more exempt than they from physical deformities and defects. Far, indeed, are we in any of these matters from being what we ought to be, but still it behooves us to recognize the position we occupy, and to look to it jealously that we lose no point in that competition in health and strength which, after all, lies at the very foundation of industrial prosperity. The Technical Commissioner, although looking with unprofessional eyes, did not fail to notice the inferiority of continental operatives to English ones in bodily stamina and working power. "Swiss workers," they report, "are short and thick-set in comparison with English ones." "The factory girls of Saxony," they declare, "are less comely than those of Nottingham." "The wool-workers of Alsace," they say, "are not equal in strength to those of Yorkshire and Lancashire," and German engineers,

although intelligent and healthy, "cannot get through the same amount of work with English ones."

Now this physical superiority and better health of our working classes is surely a most precious endowment, deserving of anxious conservation. On the lowest ground, and apart from that higher pleasure in existence which it connotes, it is the very marrow of our industrial system. As long as we remain a little taller than our industrial antagonists, as long as we outweigh them in the balance, score more on the spirometer than they, and outstrip them in athletic sports, we can afford to look calmly on temporary checks to industry in times of readjustment, to pursue without apprehension our destined path, and to keep our heads cool even on the subject of technical education. But there is need, and grave need, at this juncture, of emphasizing the truth that corporeal health and vigor lie at the root of all true success in national as in individual life; for there is some risk that in our alarm at the losses we have sustained and with which we are threatened, in the industrial campaign, and at the manœuvres of those who strive with us, we may be led to adopt measures calculated to sacrifice a cardinal to a subsidiary condition of victory. There are preachers abroad, able and eloquent preachers too, who, being deeply impressed by our diminished exports and contracting markets and by the educational activity of the Continent, would persuade us that our only hope for the future lies in a high pressure and enforced system of education, elementary and technical, which, if carried out as they advise, would, by sapping the nervous energy of our people and reducing their health standard, do infinitely more mischief in our industrial future than any attainments which it might secure could do good.

If, bearing in mind that the pre-eminence of this country has been achieved under no very advanced system of what is commonly called education, but by virtue, in great

measure, of natural advantages and of the strength, health, spirit, and endurance of our men and women, we proceed to inquire how this strength, health, spirit, and endurance, originally race characteristics, have been fostered and sustained, we meet immediately one circumstance or set of circumstances which, amongst many, merits special consideration in this connection, and that is the restrictions which have, for some time, been imposed amongst us on the labor of the weak and immature. These restrictions, as has been admitted, somewhat handicap our manufacturers in the meantime ; but no medical man who examines their effects, and contrasts the accounts transmitted to us of the dwarfed, bandy-legged, and sickly factory hands of the past with the actual condition of our mill-workers of to-day, can doubt that they have been beneficent in their operations, and must in the long run give us the advantage over manufacturing countries in which they are not adopted. Even as it is, our operatives hold their own and produce as much per head as those who, on the Continent, toil for far longer hours. And in the future, it may be safely predicted, they will, if they have their health maintained at a high level and are protected against exhaustion and over-strain, altogether distance those who go on making inordinate drafts on their constitutional resources. But in order that they may do this the benefits of these restrictions must be secured to them, and all attempts resisted to introduce, under a disguise, what would practically amount to an extension of the hours of labor. We are told with admiration of some employers on the Continent who have provided for their hands evening classes, in which subjects having a direct bearing on their daily work are taught, and attendance on which is compulsory up to certain ages, and it is not obscurely hinted that technical education might be partly carried on here by some such method. Now, yielding to no one in my appreciation of technical and science

teaching in their proper place, I would venture to urge, that it would be disastrous to resort to such a veiled scheme of industrial home-lessons or keeping in, and that what the bulk of our unskilled or slightly skilled operatives, who form the broad base of our pyramid of industry, require in their evening hours, is not a renewal or continuation of the work of the day, but an entire change, healthy exercise, restorative rest, exhilarating recreation, and complete liberty to do with their leisure what they please. Let there be science and technical and literary classes for those who have the will and power to push on—the born sons of genius or the tortured victims of ambition—or for those who find refreshment in intellectual pursuits; but for the dense masses of our work-people, who need only a small modicum of specialized skill in their daily task, quite other pastimes are desirable in order that degeneracy may be avoided. Their lives are tedious and monotonous, and they want variety, and would certainly not do their work any better for being lectured on applied science. For them, nothing but injury to health, and mental dyspepsia or discontentment, could accrue from any curtailment of their off-time, and indeed the tendency should be rather to extend than to curtail this. The division of labor, which is still steadily going on, almost involves this, for it is impossible for anyone, without detriment, to keep at some minute bit of handicraft for the same time that might be devoted to a varied and interesting occupation, without fatigue. And the segregation of labor in factories means the same thing, for the drain on attention is much heavier in the case of work carried on in a crowd than in that of work done in privacy; and the growing nervousness of the age, which elementary education must, however wisely regulated, more or less aggravate (for all education tends to nervousness), also suggests a lightening rather than an augmentation of our labor burdens, for the more sentient

a human being becomes, the less capable is he of bearing long drawn out drudgery. The load that was borne with dogged determination by coarsely organized nerves becomes excruciating to these that are finely strung, and must be often shifted, or else destructive anodynes will be had recourse to. The rapid multiplication of music-halls in our towns of late years, the portentous diffusion of betting, and the ever-increasing railway-traveling of our working classes are, I conceive, signs of the craving for change and excitement which monotonous occupation engenders, and which is not to be appeased by technical education, or banished by grandmotherly meddling on the part of employers. Unless the signs of the times are strangely misread, what our operatives in this country require are good wages, ample facilities for instruction and amusement, good music, accessible art, and absolute freedom to regulate their own affairs. They would surely resent the dispensation—described to us in glowing terms—under which many Continental operatives are content to live, a dispensation under which they are housed, and gardened, and tutored, and doctored, and co-operative-stored, and superannuated by the firm. It must be confessed that a dismal sense of inexorable routine and individual extinction is created by the pretty picture of their well-ordered lives. There comes a not unwarrantable apprehension that imbecility might result in a few generations from such wholesale and pertinacious dry-nursing, under which crowds of men are grown, fed, and tended with an eye to their productiveness, just as flocks of Aylesbury ducks are with an eye to their plumpness; and a suspicion steals into the mind that the tatters and hardships of the gipsy's tent are in some lights preferable to such clock-work comfort and prim propriety. One is almost tempted to travesty the Laureate and exclaim:

> Were it not better not to be
> Than live so full of industry.

There is no doubt something attractive in the outside survey of a huge well-oiled, smoothly-working social machine, but it is to be hoped that we do not include in our dreams of industrial development the conversion of the whole country into an immense factory, spotlessly whitewashed, well ventilated, with a smokeless chimney, and surrounded by garden allotments, schools, museums, laboratories, laundries, cottage hospitals, and neat cemeteries over which "well-groomed weeping willows" wave conventional woe.

The third factor in the industrial superiority of this country, second only in importance to physical development and health, is the inherited skill of our work-people —that special quickness and aptitude of hand and eye which are drawn from a long line of industrially trained ancestors. Anyone with half an eye must have seen how gestures and habits of movement and expression pass on from sire to son even when imitation was impossible, and must agree with George Eliot when she exclaims—

> I need a record deeper than the skin!
> What, shall the trick of nostrils and of lips
> Descend through generations, and the soul
> That moves within our frame like God in worlds,
> Convulsing, urging, melting, withering,
> Imprint no records, leave no documents,
> Of her great history?

Deep imprints, elaborate documents inscribed with the history of many a silent and forgotten soul, exist in each of us. All students of handwriting know how certain styles of penmanship run in families and remain unaltered under the most diverse methods of instruction, and all students of heredity will be prepared to admit that not only may the children's teeth be set on edge because their fathers have eaten sour grapes, but that their fingers may be gifted with nimbleness because their fathers' brows have known the sweat of labor. There is one thing that cannot be manufactured to order, and that is the genius

of a people. It is not by the leaves of a summer, multitudinous though they be, but by the immemorial foliage of bygone years that the trunks of the forest have been built up; and it is not by the exertions of any one generation, but by slow increments of growth through centuries, that English brain and muscle have reached that special development which is the substratum of our manufacturing ability. It is certainly not in one generation that foreigners, with all the advantages of technical education, but with less handy progenitors, can acquire the manual dexterity which English people possess, and of which different varieties exist in different districts of the country, in which different kinds of industries, involving different kinds of movements, are carried on. The spinners of Oldham are said to be born with a twist in their fingers and thumbs, and in the button-mills of Birmingham I was assured by experienced persons. that children brought in from agricultural districts are slower in picking up the manipulations required in that trade, and clumsier in performing them, than the children of Birmingham button-workers themselves. In a large number of industries in which English workmen excel, it is acknowledged that an inherited predisposition has had something to do with their excellence, and wherever, on the Continent, any particular industry is conducted with peculiar skill, it is pointed out that a congenital adaptation to it exists. Thus, as regards the hand-loom silk-weavers of Lyons, the Technical Commissioners say that their skill is simply marvelous, families having been for generations distinguished for dexterity and delicacy in manipulations. "From father to son," they remark, "the loom has been handed down, and the weavers meet together and talk of their work until technical knowledge has become natural to them, and skill has been raised to a high degree of excellence." Of course machines, like Melchisedek, have neither father nor mother, and are innocent of hereditary

tendencies; but wherever human beings are engaged in production, the fruits of their labor will, in quantity or quality, bear traces, like the cadence of their voice and accents of their speech, of the lineage from which they have sprung and of the locality in which they have been bred. The spider spreads its web, the silkworm spins its cocoon, and the upholsterer bee hangs its cell with the crimson damask of the rose, without any technical education, and inherited skill must count for something in the useful arts.

But inherited skill, the third factor in our industrial supremacy, will be of small avail to human beings if it is not called into play by timely exercise, and this brings us to the fourth, and last-named factor—early training of the hand. In the affairs of every organ in the body, it is now recognized, there is a tide which, taken at the flood, leads on to fortune, but which, if neglected at this critical time, leaves the organ more or less hopelessly stranded, and, in the case of the hand, that tide is in flood early in life. Writing masters attest that children who are left to a certain age without instruction can never afterwards be taught to write with grace and fluency, and a glance at any biographical dictionary will convince that almost all those who have arrived at eminence in pictorial or plastic art have felt the impulse to manual expression in early life, and have exercised themselves in it while still very young. Giotto was discovered by Cimabue, sketching on a stone one of the sheep which he was shepherding when only ten years old. Gainsborough gave proof of marked talent for landscape painting when scarcely fourteen. Canova modelled exquisitely in butter when thirteen years old. Turner exhibited in the Royal Academy at the age of fifteen. Sir Edwin Landseer gained the prize of the Society of Arts when he was thirteen. George Moreland had pictures accepted by the Academy when not yet ten. Thorwaldsen had made a reputation

as a carver of the figure-heads of ships when thirteen, and Wilkie drew spirited portraits of his schoolfellows when only seven. And so in every employment in which the hand is used, it might be shown that those who have become most proficient have used the hand early, and that, as an instrument, the hand is always awkward and unwieldy that has been left untrained in youth.

But this great principle, that the hand that is to be really a hand and not a bunch of thumbs must be trained early, rests now no longer on empirical observations, but has a physiological explanation beneath it. It has now been established by the researches of Hughlings-Jackson, Ferrier, and others, that the brain is not as it was at one time supposed, a single organ acting as a whole, but a congeries of organs capable of more or less independent action. The brain, it has been shown, may be roughly divided into a sensory and a motor area, and an area that is not demonstrably either sensory or motor, the last-named lying in front, and being probably concerned in the higher mental processes, the second, lying behind and below, being the receptacle of the impressions poured in by the senses, and the third, lying in the middle, being the fountain of all muscular movements in which will, intention, or memory are involved. And it has been further shown that this motor area, lying in the middle of the brain, is made up of a number of distinct centres, presiding over groups of muscles, and excitation of which is followed by definite movements. This is clearly exhibited in Ferrier's experiments. The animal, let us say a monkey, deeply asleep from chloroform, lies on the table before the Professor. The top of the skull is rapidly removed, the membranes are divided, and the living but slumbrous brain is exposed to view. The Professor then touching certain points on the surface of the brain, with the electrodes connected with a galvanic battery, produces with unerring precision whatever movements may be

desired. I will cause the monkey, he says, to close its hand; he touches a particular convolution, when instantly the fist is clenched. I will cause it, he goes on, to move its tail; he touches another point, and the caudal appendage (if it happens to have one) is wagged vigorously. I will cause it, he continues, to protrude its tongue; he touches another point, and out comes the unruly member. And so on through movements of the lip and nostril, leg and foot, hand and arm, trunk and head, mouth and eyes. In every instance the definite movement predicted follows on the galvanic stimulation of the appropriate centre, and the same movement invariably follows the stimulation of the same centre. To the uninitiated observer, the whole process looks like magic or an ingenious trick, and one layman who witnessed it was with difficulty persuaded that the monkey was not made of gutta-percha and fitted with springs. Not more certainly does the piano respond by certain notes to the depression of certain keys than does the brain answer by definite movements to the electric touch of certain defined centres.

Now these motor centres, which have been experimentally demonstrated in the brains of animals, have been proved by the demonstrations of that arch-vivisector disease—who is always performing the cruelest experiments on human beings, and without anæsthetics—to exist in the human brain in exactly the same order that they do in the brains of animals, so that we are scientifically entitled to affirm that a large area in the middle of the human brain is made up of motor centres, and that amongst these motor centres there is a series or group which presides over the movements of the hand and arm. But in speaking of this middle region of the brains and the centres included in it as motor, it must be mentioned that the word motor is used in a special sense. These centres are not motor simply in the sense of sending forth motor impulses in response to excitation from without—the re-

flex centres in the spinal cord can do that—but motor in the sense of being the springs of movements dictated by the will, or necessary for the expression of thought or emotion, or the gratification of desire, and in the sense of being the repository of the chronicles of all the knowledge that our muscular operations have put us in possession of. Ideal movements form a no less important element in our intellectual acquisitions than ideally revived sensations which we have experienced, and the muscles not only obey the commands of volition, but vastly increase our information and furnish us with indispensable instruments of thought. The crudest analysis of our ideas at once reveals to us that we have very few that are of purely sensory composition, and that very few objects are known to us by their sensory characters alone. If we conjure up before us the idea of an orange, we have a revival in memory not merely of the brilliant patch of color that affected the retina, and of the fragrance that titillated the olfactory nerves, but of the circular sweep of the eyeballs caused by the movements of the muscles in traveling round the circumference of the figure. If we recall in memory some bygone conversation, or a passage from some favorite author, we revive not merely the sounds of the words or the vision of the printed symbols representing them, but the actual movements of the muscles of the chest, larynx, tongue, and lips that were necessary for their articulation. Brain motor centres are incessantly taking an indispensable share in our mental life, and mind would be as impossible without them as would the circulation of the blood without one ventricle of the heart; and besides this, they are constantly animating and controlling our muscular apparatus in all its intelligent applications. It is plain, then, that the highest possible functional activity of these centres is a thing to be aimed at with a view to general mental power, as well as with a view to muscular expertness; and as the hand centres hold a

prominent place amongst the motor centres, and are in relation with an organ which, in prehension, in touch, and in a thousand different combinations of movement, adds enormously to our intellectual resources, besides enabling us to give almost unlimited expression to our thoughts and sentiments, it is plain that the highest possible functional activity of these hand centres is of paramount consequence, not less to mental grasp than to industrial success. And that this highest functional activity of the hand centres is only to be reached through the exercise of the hand, and the early exercise of the hand, I shall next endeavor to show.

Motor centres in the brain, although capable, in a way, of spontaneous and independent action, do not, as a rule, act singly, but in combined and blended action with each other and with sensory centres, and in order that centre may thus co-operate with centre, pathways of communication must be opened between them. The little nerve cells that form the active part of each centre—the hidden arcana of the mental forces—must put forth buds and branches, or arms to entertwine, or join hands with branches or arms from the cells of other centres, and innumerable cross-roads, loops and circuits must be opened up and worn smooth by traffic, in order that a brain potential may become a brain actual. A brain that is to be serviceable must be used and well used, and what is true of a brain is true of all its parts. A brain centre that is to be serviceable must be used and well used; and so it follows that the hand centres, if they are to be serviceable, must be used and well used. If a brain or centre is not used at all it undergoes degeneration, if it is imperfectly used it becomes weak and sluggish, if it is excessively used it becomes irritable and unstable. And the just use of every brain centre necessarily implies the just use of the bodily organs with which it is in connection. It is impossible to use a brain dissevered from a

body, a visual centre cut off from the eye, a motor centre cut off from its tributary muscles. It is impossible to establish communication between centre and centre, unless the parts subtending these centres are used. A muscle, the nerve of which has been divided so that it can no longer receive messages from its centre, undergoes fatty degeneration, and becomes permanently useless, and a centre that is separated from its peripheral sphere undergoes degeneration and becomes useless also. Gudden, a Swiss physiologist, has shown that if the eye of a young pigeon be enucleated, the visual centre in the brain will be found shortly afterwards to have wasted away; and it is a common observation that in persons who have been long bed-ridden by chronic disease, and debarred from all muscular exercise, the whole motor area of the brain is, after death, more or less atrophied and water-logged. It is unquestionably essential to the welfare of all motor centres, and especially of the large and complicated motor centres of the hand, that the parts with which they are immediately connected should be used in an active and varied manner.

But I must go a little farther than this, and maintain that use, to be truly useful to brain centres, must be resorted to, at the proper time, and that exercise has an even more significant relation to the growth and development of centres than to the maintenance of their healthy activity.

The several centres of the brain do not expand and blossom all at once. They evolve gradually and in succession, and in every brain there are at one and the same time zones of budding spring, of luxuriant summer, and of harvest, opulent or meagre as the case may be. In the first months of life the human brain is smooth on its surface, as the brains of many animals are permanently (the rabbit for instance); and it is during infancy, childhood, and youth, that the convolutions, or foldings on its surface, which so largely increase its area, make their

appearance, while at the same time the cells in the grey matter, which at birth are round, put forth buds and filaments, and become caudate, stellate, and branched. The brain may go on increasing in size up till twenty-five years of age, but it is during infancy and childhood that it grows most rapidly; and then it is that the convolutions are rounded off, and the centres evolved, not all contemporaneously, but in definite order and at different rates; then it is that the cells in each centre are plastic, mobile, and prolific, and may be stimulated to extend their connections. I need scarcely remark that the infant uses its leg muscles in walking long before its articulatory muscles in speech, the explanation of this being that the motor centres of the leg, in the brain, are in advance in their development of the motor centres of the tongue and lips. We now know that each centre has its own nascent or growth period, which is sometimes very short, as it must be in the centre in which the movements of sucking are co-ordinated, and sometimes very long, as in those in which are co-ordinated the movements of the hand, from its first feeble grasp, up to its consummate achievements in shaping and making. But whether the nascent period be long or short, it is of signal importance to the whole future of the centre, that it should be taken advantage of while it lasts, and that the organs related to the centre should be duly exercised during its continuance. If the nascent period is permitted to slip past unimproved, no subsequent labor or assiduity will compensate for the loss thus sustained.

As regards the sensory centres there is not much danger of their remaining unexercised; for unless you shut a boy up in a dark and silent chamber, or blindfold him and stuff his ears with cotton-wool, you can scarcely prevent him from using his eyes and ears, while the probability is that his palate, if he be left to himself, will suffer rather from over-indulgence than from defective stimula-

tion. But as regards the motor centres the case is very different, for we can restrain the use of the muscles as a whole or in groups, and deprive them of that healthy activity which is needful for their own development and for the well-balanced growth of the brain. We can pin boys down on benches, we can restrain them for restlessness, we can coerce them to walk sedately, we can withhold their hands from exploration and mischief, and their whole bodies from rollicking activity; and in doing so we are modifying the development of their brains. In two cases since the definition of the centres by Ferrier was accomplished, post mortem examinations have been made on the bodies of adult men who had each lost a leg in early infancy, and in the brains of both of them the centre for the lost leg was found somewhat stunted and undeveloped. On the other hand, post mortem examinations have been performed on the bodies of several men who had had a leg amputated after they had grown up, and had lived for many years thereafter, and in their brains the leg-centres have always been found of fully average size; from which it may be deduced that a brain motor centre, cheated of appropriate exercise at its nascent or growth period, does not develop properly, but that the same centre if deprived of appropriate exercise after it is once fully developed, does not necessarily dwindle and decay. In the latter case, having, during its development, formed communications with many other centres, it is not altogether thrown out of the circle of mental life when the limb, which informs it, and by which it is informed, is removed, but may still continue to take part in ideation, and to maintain its nutrition by adequate functional activity.

Now if the argument that the development of motor centres in the brain hinges in a great degree on the movements and exercises of youth has been followed and accepted, it will be readily understood how important the

nature of the part played by early exercise of the hand is in evoking inherited skill, and in creating the industrial capabilities of a nation. It will be readily perceived how essential it is still to insist on early exercises of the hand, if our industrial superiority is to be maintained. The nascent or development period of the hand centres has not yet been accurately measured off; it probably extends from the first year to the end of adolescence; but there can be no doubt that its most active epoch is from the fourth to the fifteenth year, after which these centres become comparatively fixed and stubborn. Hence it can be understood that boys and girls whose hands have been left altogether untrained up to the fifteenth year are practically incapable of high manual efficiency ever afterwards. And hence we can comprehend how, by keeping the children of our working-classes without hand-training, and in school up to that age, poring over books, by cramming them with decimals and geography, while their hands hang flaccid, and their digits grow clumsy and stiff, by withholding them from timely exercise in handicraft, we should be doing our best to abolish the skill of our next generation of workers. It has been urged lately by men of light and leading—amongst others by Mr. Wilson, head-master of Clifton College—that the age of compulsory elementary education should be prolonged by a year or two, but it is earnestly to be trusted that very careful inquiries will be instituted before any step of that sort is sanctioned. To me it seems not unlikely that such an extension of verbal at the expense of manual education would defeat the very object which those recommending it hold in view, and tend ultimately to banish manual dexterity and expertness from our shores. All practical men with whom I have conversed on the subject, have agreed that the manual training of the artizan or operative should not be postponed beyond the fourteenth year, and that the shop or factory is the only school in

which thorough manual training can be obtained. Book learning is an excellent thing in due season, but so is hand learning, and the one should not be allowed to usurp the place of the other. An infant taken from the cradle and reared in swaddling bands so as to be deprived of all muscular movement, and thus of the stimulus requisite to the development of the motor centres in its cerebrum, would almost infallibly grow up an idiot, and the boy who is reared with his hands bandaged, physically or morally, or who is by any means withheld from ample exercise and varied discipline of these wonderful and willing organs, must grow up, to some extent, feeble and incapable. Depend upon it that much of the confusion of thought, awkwardness, bashfulness, stutterings, stupidity, and irresolution which we encounter in the world, and even in highly educated men and women, is dependent on defective or misdirected muscular training, and that the thoughtful and diligent cultivation of this is conducive to breadth of mind as well as to breadth of shoulders. Depend upon it that there is much virtue, intellectual and moral, in a trade well learned, and that a strong, steady, adroit and obedient right hand is one of man's proudest possessions—as proud a possession as a glib tongue, for there must be a strong, steady, adroit and obedient brain behind to drive it.

The most learned and affluent Jews have always been taught a trade. Spinoza made spectacles, and Mendelssohn spun silk, and I would firmly maintain that every boy, no matter what his social position or prospects may be, should learn some handicraft, and that every girl should be brought up to ply her fingers deftly. In secondary and high schools, shops for manual training are very desirable, and such shops have indeed been provided in some of them, though perhaps they are not utilized as systematically and generally as they might be. Clearness and precision of thought, besides some vulgar use-

fulness, would flow from a brief apprenticeship served in them during the course of the longer apprenticeship to letters, and it would be a preservative to mental health, to studious brain-workers, and harassed business-men all their days, to have an interesting mechanical occupation to which to turn. In central elementary schools, like those in Manchester, Sheffield, and Birmingham, into which are gathered the more promising and advanced pupils from the ordinary elementary schools of the town or city, to be trained as managers, foremen, workmen of a superior class, or for even higher walks in life, and in which the period of elementary education is prolonged, workshops should certainly be established, so that the hand centres may not lie fallow too long. Such manual schools, attached to higher elementary schools, even although they may not shorten the subsequent apprenticeship, still do valuable work; but I question much whether success can attend the attempt to annex such schools to ordinary Board or denominational schools. The fact is that elementary schools, with the Code hanging over them and crippled by the system of payment by results, have already quite enough to do. The withdrawal of scholars for two or three hours a week, for manual instruction, from the obligatory school work, while the requirements of examiners remained the same, could only lead to increased overpressure. The expense and practical difficulty also of providing tools, material, and instruction at a large number of schools must always stand in the way of the multiplication of school workshops. The attempt to provide such workshops in connection with two Board Schools in Manchester has proved a failure, and when I visited these workshops three years ago they were abandoned to dust and dilapidation, containing only some warped benches, impossible lathes, broken tools, and very uncouth specimens of carpentry. The manual training in our elementary schools, and during elementary

education ages, which is, as it has been argued, of such high consequence to the industrial future of the country, which is, by stimulating growth in the hand centres in the brain when they are in their most mobile and ductile and active state, to preserve our national skill, and brace the sinews of the national character, is, I believe, to be most readily and effectually obtained in drawing and modeling. These should be an obligatory part of school work, and should be taught only by those who have a knowledge of them, and have been trained in the art of teaching them. Living as we have done, at any rate in the industrial hives of England, in the midst of much ugliness, and destitute of the art traditions and art treasures of some continental countries, we have hitherto neglected art education, and have been content that drawing should be taught by making shaky copies of hideous lithographs of landscapes and cottages, in which "a decent straight line would," it has been said, "be regarded as a blemish and unpicturesque." But we are awakening to a better sense of the value of drawing as a branch of education, and as the best preliminary education for the hand. We are learning that drawing when taught badly is mischievous and a waste of time, but when taught truly is conducive to accuracy of observation, to reasoning from effect to cause, to habits of neatness, to the love of the beautiful and true, and to that hand-skill which it is of such vital consequence to us to retain. By some mitigation of the demands of inspectors in compulsory and class subjects, and by some re-arrangement of our school curriculum, time must be found for the thorough and methodical teaching of drawing, which in infant schools should occupy one half the school time, and in elementary schools hold a more prominent and honored place than it has heretofore done. Drawing and modeling, it appears to me, offer the true universal training of the hand, the best exercise for the hand centres in the brain, and the most

suitable introduction to the handicrafts which the great bulk of our people must follow for a living. Now that the age at which manual occupations are begun has been raised, and properly raised, in order that elementary education may be secured, drawing and modeling have assumed a new importance as branches of education. The time to begin the training of the hand is in the infant school, and not after passing the sixth standard.

In those admirable technical schools which are springing up in our large towns, to serve as connecting links between the elementary school and the workshop, and in which the foremen, managers, and the most skilled artizans of the future will, in all probability, receive some part of their training, instruction in drawing, and more especially in drawing with rule and compass, will, in conjunction with instruction in the rudiments of science bearing upon industry, take an exalted position. The organization of these schools at present leaves little to be desired, and the work which they are already accomplishing is of conspicuous value; but here, again, we must guard ourselves against expecting too much from them, and against extending unduly the time spent in them, remembering that the workshop is still, and ever must be, the best school for the foreman, and that downright experience is the choicest training for the practical man. "The training of the shop," said Mr. Reynolds, the founder and able and energetic superintendent of the Technical School at Manchester, in an interview which I had with him a short time ago, "is, and always must be, superior to that of any technical or manual school. It is carried on under a sense of responsibility, and with a consciousness that penalties attach to failure in it, and, above all, it is real and earnest." Mr. Reynolds' remarks recalled to me the old story of the amateur angler who went to fish in a Scotch stream, provided with the finest rod and reel that money could buy, the most invisible tackle, and

the most improved fly-hooks, and who, having flogged the water for hours without getting a nibble, had the mortification of seeing an old fisherman near him pull out the trout by dozens, with nothing but a bit of stick and a string. Puzzled and disappointed, he at last went up to the old man and asked him, "What is the meaning of this? How comes it that I, with the most perfect appliances, catch nothing, while you, with only the clumsiest tools, are so successful?" To which the old man answered: "The meaning o't, Sir, I tak' to be this, that I'm fishin' for fish, and ye're fishin' for fun." The story seems to me to illustrate the difference which must, to some extent, exist between technical school and workshop training, and to explain the greater intensity of purpose and better practical results which must attend the latter.

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THE EDUCATION OF THE JEWS

BY

HENRY M. LEIPZIGER, Ph. D.

Director of the Hebrew Technical Institute, New York.

NOVEMBER, 1890.

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EDUCATION AMONG THE JEWS.

A Study in the History of Pedagogy.

Although education and instruction are co-ordinate, still their methods are somewhat different. The education of a being, as of a nation, begins at birth ; instruction only after a certain degree of intelligence has been attained. Education has for its purpose the improvement of the condition of the human race and the attainment of human perfection. Instruction uses the material that has been handed down to us and that others have found of value in forming and elevating humanity.

Among the wonderful spectacles that the world's history presents, one of the most remarkable is the survival of the Jewish people despite the many vicissitudes it has encountered, and—what is of more interest to the student of education—is the maintenance of the high standard of intellectuality which marks the Hebrew race.

This intellectuality is due to a carefully devised system of training and education—a system without a parallel in the history of nations.

According to Prof. Dittes, "If ever a people has demonstrated the power of education it is the Hebrew people." What is remarkable about the system is that it is

adapted to every age and time. No step in the march of progress finds opposition among the Hebrews; but education is regarded as a process of evolution, a continual becoming.

Education, in a true system, depends upon the ideal that is held up for attainment. What is the perfect man? In Roman days it was the valiant soldier, capable of enduring fatigue, and stoical as to his fate. Among the Athenians the ideal man was one in whom physical and moral perfection were developed.

As a religion of practical morality Judaism did not create schools of philosophy, but erected schools for children, in which both sexes were trained in the teachings of duty and of love. "Go" said two great heathen thinkers to their contemporaries, "go to the Jewish schools where the children are trained in the observance of the moral law. There is the source of its strength—that is the secret of its indestructibility. If you would conquer them, you must attack these places."

The perfect man among the Hebrews was the virtuous man, the man who strove to be like God. Virtue was placed above everything.

And this ideal colored their system of education. God was their king, their teacher, and their judge, so that Hebrew education was particularly and specially religious. The union was not of church and state, but the more important one of religion and life.

Here, in early times before schools were regularly instituted, the parents were the first teachers. Parents felt an obligation to teach their children as a command of Jehovah, and every possible means was adopted to keep alive a lofty morality and to develop that national pride for God which has marked the Hebrew through all periods of his history.

The celebration of the anniversary of the exodus from Egypt illustrates one means of keeping alive this national

love of God. On the Passover Evening symbols commemorating the great event were explained in each household to all the family, and the Talmud distinctly advised that questions should be encouraged. Even here we see the application of that pedagogic principle which favors direct observation and personal reflection as most desirable among children. But, strange to say, the contributions of the Jews to the science of education are but little known.

A study of the history of this race will show that very many of the new movements in education which mark our time have been anticipated by them centuries ago.

More than two thousand years ago they recognized the almost divine office of the teacher, established education for all upon the most democratic basis, displayed wise pedagogic knowledge in the arrangements of their schools and course of studies, and at all times favored the education of the hand in conjunction with the training of the intellect.

In the brief compass of this monograph I can give but a suggestion of the rich field that the student of pedagogy will find in the history of the Hebrew people. Certainly in the development of an American ideal, much can be learned from studying the methods which have won for the Hebrew race the following characterization: "Israel had a higher part assigned her in the drama of history, to which her secret instincts resistlessly drew her. Her predominant characteristic was an intense religiousness. Everything in the life of her people took on a serious and devout tone. Patriotism was identified with piety. Her statesmen were reformers, idealists, whose orations were sermons like the speeches of Gladstone in the Midlothian campaign, dealing with politics in the light of eternal principles. * * * The nation's ambitions were aspirations. Her heroes grew to be saints. The divine became to her not the true or the beautiful, but the good. She evidently had, as Matthew Arnold said of John Wesley, " a genius for godliness."

The character of Hebrew education during the Biblical period will be but briefly considered. The main portion of the essay will however be devoted to a view of Jewish theories and methods during the Talmudic times, which extend from Ezra's time until about the 5th century of the present era.

The Rabbis claim that systematic instruction dates from a very early period, but give no particulars as to the school. It is clear, though, from frequent references in the Bible, that all education was given at home—the parents being the first teachers. The child was not trained to be skilful in the use of weapons, or to become an artist, but a firm believer in God; so that as soon as he could talk his lips whispered of God.

The laws of Moses require the fathers to "speak of Him when thou sittest in thy house, and when thou goest in thy way, and when thou sittest down, and when thou risest up."

That the higher classes at this time were cultured is admitted, but it seems certain, from the learning of men like Amos and Michah, that ability to read and write—as yet an unattained ideal among many peoples—was general. In the course of time there arose a class of men called Sopherim or Scribes who gradually supplanted the power of the priesthood, and who became the forerunners of the great Talmudic teachers.

In Samuel's time the schools of the Prophets came into existence. Some consider these schools as the originators of the cloister, others the first academies. In these schools religion, poetry and music were taught.

The first years of childhood were spent under the mother's care, later on the father took care of his son. Ethics was the staple of instruction. Short aphorisms were repeated by the young pupil and much instruction was conveyed in the form of parables and riddles. Religious observances exercised a great educational influence.

The ceremonial law, was so thoroughly interspersed with so many holy and wise teachings that it was a complete manual of study. Nor were natural phenomena permitted to occur without being brought into play in their system of religious training.

A prominent characteristic of the teaching at this period was the answering of children's questions. One comes constantly across passages as follows: "If your son should ask you the reason of this or that law or custom, then explain to him. Wait till a suitable opportunity occurs. Do not rest satisfied with the mere dry statement of the fact but let the practice precede the instruction and then will the law become his possession."

As soon as the child reached his third year he began to memorize verses from the Bible, and when old enough a tablet was given on which he learned to form the letters. At table the children were arranged in the order of their age, so that the older children exercised dominion over the younger.

The foundation of a system of schools among the Jews may be attributed to Simon ben Shetach, who lived 80 B. C. He felt the force of what Fichte afterwards said, "Whatever you would put in a nation's life you must put into its schools," and he enunciated the proposition—not yet universally assented to—that popular education is the best strength of a nation.

Troublous times occurred in Judea. The Holy City resounded with the tramp of the Roman soldier and the Temple was in ruins. Then Jochanan ben Sakkai obtained from the Roman Emperor Titus the privilege of establishing a school at Jamnia. And from this little spark the fire of education was enkindled—a fire which has steadily burnt among the Jewish people even until our day. During the period from the destruction of the Second Temple until about 500 of this era, the Talmud was in process of growth.

The Babylonian Talmud was for more than a thousand years the very essence of spiritual and intellectual activity of the Jews. Its very existence is an evidence of the influence of the schools. This wonderful work—this unique monument of lore—has been much misunderstood. "It is not a text book or a law book; it is a veritable encyclopedia."

Its influence on the Jewish people has been described as follows:

"The historical accounts contained in the Talmud fill a chasm in the history of the Jews and Judaism for which we might, else, in vain seek the bridge.

The Talmud, containing the literature of the Jews, and alluding to so many sciences, and requiring for its understanding several preparatory sciences and other acquirements, set an example and excited the Jews of the middle ages to literary pursuits, and thus gave rise to numbers of works, the variety and ingenuity of which extort, not unfrequently, marks of acknowledgment, even from the bitterest enemies of Judaism, and prevented the Jews from falling into the same ignorance which prevailed through centuries among European Christians. To the discipline of Talmudic study, requiring, as it does, such acuteness of perception and such subtlety of reasoning, may be attributed the success with which the Jews have, in all ages been enabled to extricate themselves from the snares and pitfalls which might else have been their destruction. Moreover, in those unhappy times when the Jews were compelled to live secluded from the rest of mankind, their spirit would have become entirely torpid for want of exercise, had the Talmud not kept alive their faculties, by offering to them so vast a field of mental exercise. Lastly, by rendering the Jews a literary nation, and by having thus continually sharpened and exercised their mental faculties, the Talmud made the possibility (nay, accounted for the fact) that in much less than a century, during which

the barriers have been struck down which excluded the Jews from the remainder of European society, they have exhibited a flexibility of intellect, which both in art and science, produced so many great minds, as to exceed by far all expectation."

And of this book, the great scholar Delitzsch says:

"The Talmud, that colossal Jewish religious code, in which the Jew, educated in the lore of his nation, finds his spiritual house, is to the educated in Christendom less known than the Vedas of the Indians or the Avesta of the Persians."

The Proverbs of Solomon contain sentences on education which were not for an age but "for all time;" while in the apocryphal book of Sirach we find a "book rich in pedagogical insight, which paints with master-strokes the relations of husband and wife, parents and children, master and servant, friend and friend, enemy and enemy, and the dignity of labor as well as its division. This priceless book forms a side-piece to the Republic of Plato and his laws on ethical government."

We are not surprised that a race that had made two such contributions to educational literature should in the Talmud evolve a perfect pedagogic system. In its pages will be found gems of educational wisdom. At a time when the schoolmaster was despised, when intellectual darkness reigned in all the European countries, the Jewish rabbis carefully elaborated and practiced those wise pedagogic rules which are to-day slowly but surely coming in vogue. Only within the present generation has England established a national elementary school system. The Jews established theirs twenty centuries ago. The Puritan fathers only carried into practice sound Jewish teaching when they insisted with Joshua ben Gamala that every community should support a school. Truly it can be said in the words of Isaiah, "Out of Zion shall go forth the law, and the word of the Lord from Jerusalem."

We shall consider the subject under the following heads.

I. Importance of Schools and Instruction.
II. Founding and Spread of Schools.
III. School Organization—including
  A. School house.
  B. Teachers.
  C. Schools.
  D. Material.
  E. Method.
  F. Regulations.

IMPORTANCE OF SCHOOLS AND INSTRUCTION.

The wise men of the Talmudic times had the highest conception of the value of schools and instruction; the school was to them the long and short of life. The profession of teaching was regarded as the very highest, as one in which God himself was engaged. "What does God do in the fourth hour?" is once asked in the Talmud. "He teaches little school children." The ancient history of other nations may be searched in vain for a single instance of regard of the high importance of the school, such as Rabbi Jehuda uttered in such distinct words when he said "The world is only saved by the breath of the school children."

The importance of the school and instruction, according to the Talmud, cannot be overrated. The very stability of the world, if it is to be the abode of intelligent beings, is connected with the school as effect is to cause.

"A city without schools should be destroyed or excommunicated." And "Jerusalem was destroyed because its people neglected the schools and school children."

As a consequence, the teachers and schools were regarded as the keepers and defenders of the city. For where spirituality dwells in a people or state, which permits all

circles of life, there the moral perfection of all its citizens is striven after, and the teachers of children take an honored place in society, and become the real defenders of the city; educating, training and elevating its citizens. "A President of the Academy" relates the Talmud "once sent several learned men from Palestine to aid the progress of instruction and establish schools where none existed. They came to a city where they saw no sign of a school nor could they find a teacher. They said to the citizens, 'bring the keepers of the city before us.' The magistrate and the chief police officials appeared. 'These are not the city's keepers!' the wise men exclaimed. 'Who then are?' asked the citizens in astonishment. 'The city's keepers are the teachers,' was the reply."

"When you see lovely gardens by the stream and the brilliant stars in heaven," says the Talmud, "then you have a picture of the true teacher, who takes care of the tender plants and sheds mild light on the dark world of growing childhood." The most beautiful ornaments of humanity are the teachers surrounded by children.

This conception arose from a natural feeling of *love* which they fostered. Each teacher felt it to be the most welcome task of his life to teach. The Talmud relates of Jochanan ben Sakkai that he spent a third of his life in teaching, and the Rabbi Akiba said to one of his disciples, "My son, the cow is more anxious to suckle than the calf to suck."

The classic nations of antiquity did not have the same regard for the dignity of the teacher as the Jews did. Among the Greeks and Romans the trainer of children was a man without standing, a veritable pariah in the community. The post of teacher was despised, and the teacher and servant were put on par.

This is what Plutarch says of the Roman pedagogue: "For if any of their servants be better than the rest, they dispose some of them to follow husbandry, some to navi-

gation, some to merchandise, some to be stewards in their houses, and some lastly to put out their money to use for them. But if they find any slave that is a drunkard or a glutton, and unfit for any other business, to him they assign the government of their children; whereas, a good pedagogue ought to be such a one in his disposition as Phœnix, tutor to Achilles was."

The life of the teacher was closely bound to that of the scholar. Teacher and scholar were one and inseparable. Teachers and scholars shared each other's failures.

The disinterestedness with which they pursued their vocation indicates the love they had for their calling. The only reward which they were promised and which they desired, was to learn and then to teach. He who studies the law in his youth will use it in old age. He who has pupils in his youth will have them when he is old.

The father was no less convinced of the importance of instruction to the child. "A learned man," says the Talmud, "met a friend leading his son hurriedly to school."

"Why such haste" he asked him.

"Because," he replied, "the duty to lead the child to instruction precedes all other cares."

Another learned man did not eat his morning meal before his son was in school.

The esteem for the teacher and the love for him made instruction thus a pleasant duty.

Relating to teachers the Talmud says:

"He who has studied and does not teach resembles a myrtle in the desert."

But it was not the teacher alone who strove to awaken the intelligence of the child and to guide it in the right path; the father was obliged to do his share. "Who is ignorant? He who has sons and does not have them taught."

Many are the aphorisms to be found in the pages of the

Talmud on the importance of industry and perseverance in study. "The day is short and the work great, the workers are lazy, the reward is great, and the Master praises." "It is not the same if one studies alone or with a teacher." "Do not say 'When I get time, I will study.' Perhaps you will not get time."

RISE AND SPREAD OF SCHOOLS.

It is to Joshua ben Gamala that the organization of the Jewish school system is due. More then eighteen centuries ago he initiated it, carefully nursed it, and planted the seed so thoroughly that even in the smallest village a school became recognized as a necessity. It was he who thus started that intellectual movement which has characterized the Jewish people down to the present day.

"Before Joshua ben Gamala," relates the Talmud, "the father was the teacher of his children—and fatherless children received no instruction. To supply the need, children's schools were established in Jerusalem."

But things went on as before and only children who had fathers to look after them attended these schools, while the fatherless and uncared-for child as a rule did not go to school.

Then a school was established in each community, which was attended by scholars who had reached sixteen years of age, who did not need the discipline of the child and were left at their option. It was then that Joshua ben Gamala appeared and ordered that in each town a school should be established and that children from the age of six upwards should be obliged to attend thereat.

From that time on, school instruction was a matter conducted in real earnestness, as the ordinances established sufficiently prove. After Rabbi Joshua's law was promulgated no one was permitted to take a child to school

from one city to another, the inhabitants of each city could be forced to maintain schools and teachers, and there was a stern prohibition against living in a town which was not provided with a school.

Rabbi Joshua's work was not temporary. Its effect was lasting. The spread of schools during his time was the most extensive that we can imagine. Schools sprung up everywhere and parents cheerfully brought their children to them. And if, perhaps, some of the Talmudic statements in reference to the number of schools, scholars and teachers appear at times exaggerated, still the fact remains that in every important city the school attendance was very great.

INNER ORGANIZATION OF THE SCHOOLS.

A. SCHOOLROOMS.

Space, Name, and Arrangement.

At the beginning of the Talmudic period it was the custom, in case no proper house was provided, to give instruction in some place in the open air. But from the time of Rabbi Jehuda Hanassi instruction was given in rooms specially arranged. These schools went under various names, such as Beth Hamedrath (House of Learning), *Yeshiba* (and sometimes under the Greek name "Skole)," Schools for children were held in what were termed Beth Ha-Keneseth. They were generally situated in the quieter parts of the city, so that the lessons might not be disturbed. Benches, stools, and cushions were only introduced into schools long after the schools themselves were established.

Maimonides furnishes a very correct picture of a school in practical operation.

"The teacher sat above, and the scholars surrounded him

as a crown the head, so that all could see and hear the teacher. The teacher did not sit on a chair while his scholars sat on the floor, but *all* sat either upon chairs or upon the floor. It was formerly the custom for the teacher to sit while the scholars stood, but shortly before the destruction of Jerusalem it was arranged that both scholars and teachers should sit. Children sat *in front* of their teacher so that they could see his face when he spoke, in accordance with the words of Isaiah 30: 20, "Thine eyes shall see thy teacher."

The school houses were the favorites of the Jewish people. There they were wont to assemble. The house, the school and the synagogue formed a three-fold link which bound the race of the old book to the book of the ancient race. The school house was open all day.

B. THE TEACHER.

(*a*). *Choice of Teachers.*

On moral grounds no unmarried man or any woman could be a teacher. And among the number of those eligible to teachership only the best were chosen. The words of Rabbi Akiba are noteworthy in this regard. "Do you desire to hang yourself? If so, select a lofty tree," which, interpreted, means, "Learn from a distinguished teacher." The most experienced teacher was regarded as the most desirable, and when it came to a choice, always had the preference. "Instruction by young teacher" says the Talmud "is like sour grapes and new wine, while instruction by old teachers is like ripe grapes and sweet wine."

If however a less capable teacher had once been engaged, he was not set aside for a more competent, and for this reason. Perhaps the latter would be careless, since he would boast that he had no peer, and would not fear dis-

missal. The Talmud gives many "points" that should be considered in selecting teachers. In one place the teacher who gives his pupils much matter although he does not ground them in it is preferred, while in another place *thoroughness* is deemed most desirable. On the whole *thoroughness* was the chief point desired, because the Talmud lays great stress on the development of the understanding and the memory, and thoroughness is a great aid thereto.

(*b*). *Qualifications of the Teacher.*

Even temper and calmness, which do not permit of sudden anger, patience so that the teacher enters into the environment of the child and thinks with him,—these are the chief qualifications of the teacher. So Hillel said, "A hot-tempered man cannot be a teacher."

The Talmud says that "No child can ask too many questions from his teacher; he must repeat again and again so that he shall thoroughly understand what has been taught."

As additional qualifications, truth and exactness were demanded from the teacher. So highly impressed were the Talmudists with the sacredness of the teacher's work—for it is none other than humanizing the world—that school instruction was styled "God's work," so that according to Maimonides a careless teacher received the following severe criticism: "The teacher who permits his pupils to remain idle, or engage in other work during school time, or is careless about his instruction, belongs to those of whom it is said 'Cursed be those who manage the work of God basely.'"

Piety and culture are finally the indispensable requirements of a teacher.

(*c*). *Respect for the Teacher.*

Owing to the esteem with which instruction was regarded and to the responsibility placed upon the teacher, a deep respect for the teaching profession followed as a matter

of course, for the teacher was considered as the expounder of the truth and the founder of human morals and well-being. Among the ancient Hebrews respect for teachers was identical with respect for God and his law. "Respect your teacher as you would God." Irreverence towards teachers was severely punished, and it was said that "Jerusalem was destroyed because the teachers of that city were deposed."

Teachers were even more respected than parents. "The teacher precedes the father; the wise man, the King." If the father and teacher are both a prisoner, we should first free the teacher, then the father, for the one gives him only the temporary, the other eternal life.

A few examples of reverence, although intended more for advanced student schools, are still characteristic.

The scholar must not express his opinion in religious or ceremonial subjects in the presence of his teacher.

He must not walk at the right of his teacher.

He must not call his teacher by name.

He must not sit in his chair, nor pray before him nor behind his back, he must not go to bathe with him, he must not contradict him in his presence, etc.

All services that a servant must do for his master must a scholar do for his teacher except to take off and put on his shoes, etc.

When a scholar leaves his teacher's presence, he must not turn his face from him but gradually turn from him.

C. THE PUPIL.

(*a*). *School-Age.*

Recognizing the fact that systematic instruction before the sixth year would injure the bodily development of children and because they wished to foster a sound mind

in a sound body, the wise men of the Talmud fixed upon the sixth year as the time for going to school. "He who sends his son to school before his sixth year runs after him and cannot catch him;" and this is interpreted to mean he wants to strengthen and maintain him and cannot, because the boy is doomed to die on account of weakness.

Still children were early taught the elements of religion. "As soon as the child begins to speak" reads an old precept, "shall the father teach it the confession of God's unity. 'Hear, O Israel, the Lord our God is one Lord.'"

(*b*). *The Psychical Individuality of the Pupil.*

As attention was paid to the pupil's physical development, so too was his psychical individuality cared for. He was not rapidly hurried from one subject to another, but led slowly and according to his ability to comprehend and grasp it. The subjects of instruction were adapted to the age and mental ability of the pupil. Until the tenth year Biblical instruction was the chief study, so that at ten years of age the pupil was thoroughly conversant with the Bible. From his tenth year upwards, the Mishna and Gemara (divisions of the Talmud) were the special topics of instruction. With increasing mental power, subjects of corresponding difficulty were introduced into the school curriculum.

It is not always the case that as a child grows older his mental grasp is strengthened, and therefore it is advised that while at the beginning of instruction, when the mind is still free, great attention should be paid, because what is learnt as a child remains in the memory like ink written on clean paper; still if the child does not progress, great forebearance should be exercised with him until his twelfth year. From that time he should be severely disciplined because about the twelfth year the normal child attains possession of his mental powers.

The ability to comprehend a subject and the love for study appears in different children at different periods of

their lives. Some children readily remember and understand all that the teacher tells them. Some however understand readily but do not remember. Others again recollect the illustrations which a teacher uses but do not understand the subject at all, and some are just the opposite. These four classes of pupils are thus characterized in the Mishna. "There are four kinds of scholars; a sponge, a funnel, a sieve, a winnow. The sponge absorbs everything, the funnel takes all in at one end and lets it out at the other, the sieve lets the wine pass through and keeps the lees, and the winnow removes the coarse meal and keeps the fine."

These characterizations furnish a key to the management of the various subjects of instruction, namely, that the teacher must use a different method in dealing with the different categories of pupils. With pupils of the first and last classes the instruction can be broader and illustrated from collateral subjects, while with the other two classes it is recommended to stick close to the topic and to use simplest illustrations. Similar advice is given to teachers with regard to the varying memory stages of the pupil. Four qualities make their appearance among pupils: Some understand readily and forget quickly; here the advantage balances the disadvantage. Some grasp slowly and forget slowly. In this case the disadvantage balances the advantage. Some grasp quickly and forget slowly—that is a good quality; and finally some learn slowly and forget quickly—that is a bad trait. The teacher can by various means overcome these difficulties—nor will he complain about them, for these very weaknesses compel him to think about ways and means of removing them.

It was recognized that learning, in a narrow sense, depends upon the activity of the memory as a preparation for the other mental powers. Great stress was therefore laid on the cultivation of the memory and it almost became

axiomatic that "Knowledge is won by aid of recollection, therefore train the memory." The development of the memory was attained in the following ways.

1. By practice, which was constant and gradual.
2. By discipline.
3. By thorough preparation of the subject.

(*c*). *Behavior of the Pupil.*

As Socrates did not accept as his pupil every one who applied to him but like his predecessor Pythagoras was affected by the outward appearance and demeanor of the scholar, so too did the Talmudic teachers in their high schools. Rabbi Gamaliel said, "every scholar whose deportment does not correspond to his inner aspirations should not attend the house of instruction." The same idea prevailed in elementary schools. As soon as a child proved himself incorrigible and liable to exert a baneful influence on his fellow pupils he was removed. "He who permits an unworthy pupil to remain in the school must be responsible for the evil consequences."

(*d*). *Honor of the Pupil.*

"Think as much of your pupil's honor as of your own;" so reads a direction of the Talmud to teachers and educators in regard to the fostering of the feeling of honor in the child. This precept is of great pedagogic value, because if it is followed the foundation of a lofty feeling of honor will be early laid in the child. In every child there is feeling of self respect which is his dearest possession. This feeling evidences itself in many ways in the school room—perhaps as a keen appetite for study and a desire to be the head of the class, or in an endeavor to be the most modest and industrious pupil.

The cultivation of this feeling, then, becomes one of the most important duties of the teacher, and he was warned

against hurting, particularly in any public way, the feelings of his pupil.

D. SUBJECTS OF INSTRUCTION.

(*a*). *National Literature.*

The subjects of instruction may be generally classed under the head, national literature, which includes the religious writings—the Bible and the Talmud. These subjects were so arranged that their study, as we shall see, covered nearly all known sciences.

The course of study was divided into three parts, 1st, Mikra (reading) ; 2nd, Mishna (repetition of the law) ; 3d, Gemara, (completion). The primary classes studied Mikra, and, according to Maimonides, the school session lasted all day. This may appear strange to us. It is probable that games were interspersed in the hours of instruction, and from time to time the teacher varied the exercises by relating parables or legends from the Talmud. (Hagada.)

The second division studied Mishna. Here the pupils ranged from 10 to 15 years. The teacher explained the oral law, or laws interpreting or explaining the Mosaic law, and which was put in form by Rabbi Judahin in the third century. Most of the instruction was oral.

The students from 15 to 18 years of age studied the Gemara. The oral laws form the subject of discussion and the students criticize the interpretations freely yet respectfully, and contrast two *Halachoth* (Rules). The teacher's duty is to refute the students' objections.

The various discussions embrace in their course natural history, anatomy, medicine, geometry and astronomy, all of which sciences were considered however only as the periphery of the true science, which was the law.

As soon as the child was able to read, the teacher began instruction in the Bible, and certain particular passages were preferred. The portions chosen for the beginning

were either the 3d Book of Moses—containing the law for the priests, or the directions as to sacrifices. "Why," asked the wise men "should the first instruction in the Bible to children begin with the laws about sacrifices?" "Because little children are innocent and pure, and sacrifices are symbols of purity."

In the higher schools instruction was given in Talmudic subjects. The Gemara was only taught in the most advanced schools.

(*b*). *Foreign Languages.*

There are many facts to prove that in Talmudic times the Jews were well acquainted with foreign tongues; thus we find the query as to whether law could be read in distant lands in the language of the country.

Great value was attached to the study of languages as is shown by these remarkable words: "Holy Scripture says that God not only created heaven and earth but also language—because language creates a new world, the world of thought." All languages, even those of Israel's oppressors, were considered of great importance. Of all tongues, the Greek language was the favorite foreign speech of the Jews. "The law may be translated only into the Greek tongue because only that language can fully interpret it."

The Jews were always lovers of the beautiful and noble and the richness and pleasant sound of Greek particularly attracted them. Greek was considered the proper language for poetry. "Four languages," it is said, "which were spoken in and about Palestine possess each distinct attributes. Greek sounds sweet on account of its rhythm in song; Latin, on account of its sonorousness in battle; Syriac, by reason of its numerous voices in songs of lamentation and Hebrew on account of its distinctness in speaking." Instruction in Greek was general. This love for the Greek tongue remained for centuries among the

Jews. The President of the Academy in Nahardea was skilled both in Hebrew and Greek lore. In Spain, in Saragossa and Barcelona, Greek was earnestly studied, so much so that in the year 1304 the Jews of Spain felt obliged to forbid the learning of Greek before the 25th year. Although the Jews showed such a decided preference for Greek culture, still it did not prevent them from taking an interest in the languages and sciences suited to their time.

As in Palestine during the period of the second temple, the Hebrew tongue was gradually replaced by a Syriac idiom spoken by the neighboring peoples; as in Alexandria the Jews spoke and wrote Greek, so at the time of the destruction of the second temple the Jews appear as Latin poets and critics. Unprejudiced and willing, they went about their work, encouraged by their words. "Every word that proceeds from God's mouth is divided into seventy parts—i.e., into all the languages of the world;" meaning that no matter in what tongue an idea was expressed, it became a power for good, provided it was true and liberal.

(*c*). *Astronomy, Mathematics and Natural Sciences.*

The life of the old Hebrew was dedicated to the pursuit of religion; so the study of these sciences was not merely for intellectual purposes, nor for information that might lead to man's advantage or give him a loftier idea of the glory of God, but solely as an aid and help to religion. They were used as means for a deeper study of the law which formed to them the center of a circle as the sciences formed the periphery.

Many passages from the Talmud prove that these sciences were studied at this period. Rabbi Gamliel had in his study, charts and pictures of the moon. Samuel, a noted Rabbi, said he was as much at home in the streets of the heavens as he was in the streets of Nahardea.

Many of the Tractates of the Talmud show an extensive acquaintance with geometry. In another tractate a long list of plants and animals can be found. Still another furnishes information concerning animal anatomy.

It is doubtful whether these subjects were regularly taught in the elementary schools, but it is certain that the pupils of maturer age advanced far beyond the mere elements of these sciences.

(*d*). *Gymnastics.*

Gymnastics seems to have formed a part of divine worship in Mosaic times. It appears from the Bible that in David's days games with weapons and other forms of athletic skill were general. In Talmudic times the development of the body was advocated, partly as a personal benefit, partly also on religious grounds. This is shown by the command: "Every father must have his child taught to swim."

In the time of Antiochus Epiphanes, Greek gymnastics were introduced into Palestine, and the Hellenic party built a gymnasium in Jerusalem. At the time of the Roman rule in Judea, there were Roman circuses in many towns of Palestine, against visiting which Rabbi Meir warned the Jews, as destined to lead them to worship Roman gods.

But both intellectual and physical culture were considered only as accessories in Hebrew education, that which formed the principles of their teaching was morality and religion. So it was that, quite different from the old Spartans, physical deformity was not considered a crime in Hebrew eyes; and never were they guilty of that exposing of children which forms such a blot on the record of so many nations of antiquity. That, however, which they did regard with horror, and which they punished severely, was moral deformity, which might prevent the child from becoming an honest and moral man.

E. METHOD.

(*a*). *The Outward Bearing of the Teacher.*

In order to arouse the scholar's interest in his studies the Talmud deemed it necessary that between pupil and teacher feelings of mutual regard should exist. This should be brought about by the teacher encouraging the youthful tendency to cheerfulness, without however degenerating into frivolity. A distinguished teacher, relates the Talmud, awakened the interest of his pupils by beginning his lectures with a humorous anecdote, and then proceeded to the subject in hand, to which the scholars gave most earnest attention.

This cheerful earnestness should mark all intercourse between pupil and teacher. It is highly important that the teacher should listen patiently to the many questions of the learner so that he may ward off that sense of false shame which hinders so many children in their pursuit of knowledge.

(*b*). *Knowing and Understanding.*

In the earliest stages of education, the Talmudists advised that children first be furnished with subject matter before they are ready for reflecting thereupon. "First learn and then apprehend." For this reason it was forbidden to give the children opportunity for unnecessary investigation of things. "Take your children away from unnecessary reflection."

Even for adults this rule held good, and therefore the endeavor of all was for knowing to precede apprehension.

(*c*). *Memory Exercise.*

While it is advised that in the beginning acquaintance with the subject matter should be the main point aimed at, still it was not meant that the instruction should be

mechanical. On the contrary means were given to the teacher by which he should stimulate the thinking faculty and awaken the power of observation. Teachers were recommended to ask odd and queer questions in order to startle and then to concentrate the attention on the very opposite.

(*d*). *Form of Imparting Instruction.*

The subjects of instruction were divided into portions which had to be studied in a definite period. These periods were five years each and these were again subdivided into yearly periods, in order to render it possible for the pupils to grasp the entire subject. The existence of this plan shows that a *successive* method was employed. Instruction in the Bible and the Talmud did not go hand in hand, but the one followed the other; this being the principle, "If you lay hold of too much at once you get hold of nothing."

In order to aid the pupil's understanding, the teacher should not give too much matter at once, but give a little at a time and allow a period of rest. "God himself did not give Moses the Law all at once, but revealed it to him in several periods. How much more should this be done in human instruction."

Brevity is particularly recommended. The teacher should be sparing of his words, and express himself in the concisest manner possible. Learned digressions from the subject should be avoided and scholars should not be told in three words what could be said in one. "Always teach your pupils in the shortest possible manner."

(*e*). *Thoroughness in Instruction.*

The choice of the shortest method of instruction aids thoroughness, since too much can more readily injure than too little.

As means towards *thoroughness* the Talmud advises (1) careful and correct grounding, and (2) *practice* and *repetition*. Rabbi Akiba said, "The teacher must not only make the lesson clear to his pupils by means of illustrations and explanations, but must be untiring until they thoroughly grasp the contents of what he has taught." One Rabbi repeated a certain matter four hundred times to one of his scholars before he fully comprehended it.

Such methods were used (1) to prevent superficiality in learning, (2) to impress the knowledge acquired upon the memory, (3) to promote the acquisition of further knowledge.

The latter two points were stimulated by *viva voce* repetition of the pupil, and a system of mnemonics. (*a*) Vocal repetition of the learner fixes the matter in the memory. "Open your eyes" says the Talmud "so that you may keep your knowledge, and that it may be alive in you." (*b*) The old Greeks treasured and practiced an art of memory which was based on the law of association. The Jews, too, valued the system of mnemonics as a valuable help to memory. They used certain "catchwords" having sounds or letters which would remind them of the contents of the paragraph, or they used well known quotations from the Bible or Proverbs, or names of well known persons or places.

(*f*). *Other Methods.*

In order to sharpen the child's intellect it was considered advisable to change the school it attended in order that it might get the benefit of a new method or of greater ability in teaching. "Children should be taken from one school to another so that they may learn from the teachers who perhaps may have greater ability to give instruction." "He who learns constantly from the same teacher and gets only his opinion of the law, sees no sign

of the blessing." "A scholar who finds difficulty in learning should visit several schools."

Older pupils were advised to study in groups without reference to the fact whether both were equally studious. As a little piece of wood can light a large piece, so the young and less capable pupils stimulate the large and more developed ones. Iron sharpens iron, i.e., as one piece of iron sharpens another so one scholar does the other.

Disputation in debate is a most valuable aid to thoroughness, therefore the Talmud declares "Knowledge becomes the property of the student by disputation, and elaborating the phrase" *docendo discimus*, Rabbi Chanina said "I have learnt much from my teacher, more from my fellow students, most of all from my scholars."

(*g*). *Connection between Instruction and Life.*

While the Jews believed in education for education's sake, still they regarded the theoretical side of instruction but as a preparation for practical life. The saying "Not learning but doing is the principal thing," is proof that the school was not the end in itself, but only a means and a preparation for life and thus they evinced in their way their belief in the principle, "Non scholae sed vitae discimus."

The practice of the Law is more important than the study. He who knows the theory but never practices is an *am haarez* (ignoramus). Practice was acquired in association with learned men or teachers. This was considered very valuable, since the ordinary conversation of wise men is profitable.

Without regard to social position in life, the Talmud ordered that, besides study, a handicraft should be learned. "As it is your duty to teach your son the law teach him a trade." "Disobedience to this ordinance exposes one to

just contempt, for thereby the social condition of all was endangered." "He who does not have his son taught a trade prepares him to be a robber." "He who applies himself to study alone, is like him who has no God."

For the before-mentioned reasons and because one-sidedness in education was undesirable and partly for hygienic reasons, the greatest teachers of the Talmudic period were also workmen, who, while pulling the thread through the sole of the shoe or rolling their barrels to the market place, were meditating upon serious philosophical questions.

(*h*). *Influence of Instruction on Piety and Morality.*

The old Jews did not aim at intellectual progress only, but their principal endeavor was to develop the moral and spiritual side of man. Their endeavors were directed therefore not alone toward knowledge, but also toward love and reverence of God, and the development of the moral feeling and will. To think honestly and to act honestly must be the result of the study of the law. Abaji taught, it is said, "Thou shalt love the Eternal, thy God;" that means that, through you, God's name shall become beloved and glorified.

Thou shalt learn and mix with wise men, but all thy acts must be honest and thy words gentle, so that the people will say "Hail! to him, because he has studied the law; hail! his father, who permitted him to study; hail! his teacher, who taught him; woe to those who have learnt nothing! Look at him who has studied, how pleasant are his ways and how gracious his deeds!" But if you have studied and mixed with the wise, and your conduct toward your fellow men is not seemly, then will the people say, "Woe to him who has studied! woe to his father who had him instructed! woe to his teacher who has taught him! Look at him who has studied the law how corrupt are his acts and how hateful are his ways!"

The child must learn as early as possible to avoid pride and honestly to direct his better mind to study; to show respect for his teacher, his superior, respect for all from whom he receives instruction, and above all respect for the elders, to imitate whom he must constantly strive.

"Only he possesses true knowledge who does not display it." "The law is not in heaven, where you must ascend, or on the other side of the sea," i.e., you will find it neither with him who in the extent of his thoughts resembles the ocean; nor will you find it among the proud or around merchants or pedlars; "Why," it is said in another place, "does the Book of the Law resemble water? For it is said 'Come ye that are thirsty, drink!'" Because the law, like the water which leaves its high position and chooses a lower spot for its slopping, has its seat among the humble in spirit. Another Rabbi asked, "Why does the scripture resemble water, wine and milk?" Because as these three drinks are kept in ordinary vessels, so are also the words of the law only in meek men."

The following story illustrates the point. The daughter of a Roman Emperor once asked Rabbi Joshua ben Chanaujah, how it was that so gifted a man as he was so ugly. Without replying to her question he asked her, "In what kind of vessels are your father's finest wine kept?" "In earthen ones" she replies, "I am surprised at that" he said. "Wine for the royal table should be kept in golden vessels." And she told her father the Rabbi's opinion, and he had gold and silver vessels made for the purpose. But the wine turned sour. When the Emperor asked Rabbi Joshua his advice on this subject, he said his words were only a reply to his daughter's question.

SCHOOL REGULATIONS.

(*a*). *Classes.*

The perfection of school organization is attained when the scholars are arranged according to their mental stature

and where each class is provided with proper instruction. In the Talmudic schools there were such divisions. The Beth Hamidrash or house of study was divided, as we have before said, into three great departments, each of which covered a course of five years, and each course was subdivided in smaller courses, graded into lower and higher degrees. It was not possible for the same teacher to give instruction to a beginner and one who had already attended school for some time. In many of the classes there were monitors, generally the best scholar. He received his instruction with the rest of his classmates and then imparted his knowledge to the weaker pupils. The teacher was thus not hindered by the weaker pupils and they enjoyed the benefit of extra instruction. The pupils were accustomed to be seated, according to their rank, and the desire to be head of the class was certainly a great stimulus. In many of the classes too, instruction was given by a teacher who had a special knowledge either of the Bible or the Mishna or the Gemara.

(*b*). *Number of Scholars in a Class.*

How many children can a teacher, with advantage, instruct? In our day when classes often contain more than sixty children, the teacher's duty seems to consist in getting "around the class once." The Talmud says "For one teacher there should be twenty-five scholars; If there are fifty, there should be two teachers. If there are forty an assistant teacher should be appointed, and these teachers should be paid by the city." It may have been that these rules were adopted for sanitary reasons, for in a crowded room the vitiated atmosphere affects the physical condition of the children. Or perhaps too many children in a class make it difficult for the teacher to properly perform his functions. The maximum of scholars for one teacher was fixed at twenty-five, for double that number

there were two parallel classes each with a regular teacher. If the number of scholars was not sufficient however for the employment of an extra teacher the brighter scholars were called in to help. Both Bell and Lancaster adopted this monitorial system, although in Talmudic days it was not abused.

(*c*). *School Sessions.*

Punctuality in coming and going, in beginning and ending, is of great advantage in instruction. A fixed time for opening and closing the school. Instruction was commenced very early in the morning. According to Maimonides, the school period continued without interruption, and instruction was given every day in the week and all day long with the exception of a recess mid-day. The only holidays were the sabbaths and festivals. The interruption of school instruction was strictly prohibited. Nothing was important enough to supplant it. The Talmud says "The instruction of children may not be interrupted even on account of the building of the Temple." It may seem in our time impossible or unwise to continue the school session the whole year, but there is a tendency even in our time to use the vacations to the pupil's advantage by the study of nature, and by kindred means.

(*d*). *School Rules.*

The following are some of the Talmudic school rules:

a. Punctuality and regularity in attendance at school.

b. Pupils to be arranged according to their class standing.

c. No pupil was permitted to leave his seat without permission.

d. The scholar was not permitted to question the teacher immediately upon his entrance into the school room.

e. Questions not pertaining to the subject matter of instruction must not be asked.

f. Two scholars were not permitted to ask questions at the same time.

(*e*). *School Punishments and Rewards.*

The old Hebrews appealed in these respects more to the feeling than to the reason. He who gives instruction either to large or small pupils should not compel them to study by threats, or chastisement. The teacher should rather win the heart of the pupil, without however becoming too familiar with him. There should always exist on the part of the scholars a degree of reverence for the teacher. This advice is given to teachers, "Occasionally be very strict, without however being harsh." The Talmud says "Push away with your left hand, but bring back again with your right; and do not do like the prophet Elisha, who pushed away his servant Gehazi with both hands and made him an apostate from his people." And again, "Pupils should be punished with one hand and caressed with two." This mild discipline was always effective when it appealed to the sense of honor of the pupil. In the case of small children, where the feeling is not yet developed, the Talmud recommends light corporal punishment and a deprivation of food. The grown up pupil however must not be punished corporally. In administering punishment the individuality of children should be considered. It thus can happen that two children guilty of the same offence would be punished in different ways; or even one child should receive punishment and the other be sufficiently punished by the dread of it. If bodily punishment was given it was very light. The teacher was not permitted to hit with a stick for it might easily wound, but used a shoe-string instead. As punishment is a part of school discipline, so also is reward. It is said that one distinguished

Rabbi had in his elementary school, honey which he gave as a reward to the children. In the reward and the treatment of children there was one main rule of discipline and that was the equality of all children before the teacher. Therefore the Talmud disapproves of the conduct of Jacob in preferring Joseph to his brothers, and regards that as one of the reasons for the bondage in Egypt.

(*f*). *School Dues.*

The old Hebrews believed in the principle enunciated by Socrates, that education and instruction were ends in themselves. They believed that the study and instruction of the Law should be pursued without any other material object. Therefore there was a prohibition against taking any fixed sum in payment for the services as a teacher. "Do not make instruction a crown, to exalt yourself therewith, nor a spade, with which to dig;" meaning thereby, do not use your knowledge as a means of self-glorification, or as a means of livelihood. The care of the teachers was however provided for in general either by gifts or special aid. The Talmud says. "He who makes a present to a learned man does as good a deed as though he brought a first offering to the altar."

Maimonides in one of his commentaries writes: "We do not find anywhere that our wise men strove for earthly possessions. They did not collect money for the schools, for the judges and teachers. But we find among them at all times both the poorest and the richest." Most of these teachers, even if they were poor, could have had all the money they needed for the asking, but they preferred to support themselves by hard manual work.

The teachers of the very young children did receive pay for caring for them, and the pay of these teachers came from the general tax fund of the community. The schools were open to rich and poor alike, with the differ-

ence that the wealthier members of the community paid a special school tax while the poor, who were exempt from payment of all taxes, formed a class of free scholars.

IV. EDUCATION OF GIRLS.

Little is said in the Talmud about regularly organized schools for girls.

The instruction they received, was mainly what may be termed private instruction and consisted in the study of the Bible. That they must have been educated appears from the wisdom with which the Jewish mothers exercised their functions. The Talmud says the parents must aid their children in their studies, that is, the father and mother. The mothers often explained the lessons that the teacher could not make their pupils understand, so that though there were no schools their education was far from neglected. The education of girls was directed rather to the training of their feelings rather than the development of their understanding. Girls were not to become learned but rather intelligent mothers. The Talmud asks, "Where will you find true religion?" and answers by saying, "In a family where there is a good mother." In place of scientific training, the domestic virtues were cultivated. Household economy, dancing, music, and Greek (the polite language of ancient days), were the chief subjects of the education and curriculum of girls.

There were also many learned women in those times. Veruria wife of Rabbi Meir, was famous for her learning. In the 12th century a Jewess delivered lectures on the Talmud, and the daughter of Rabbi Meir wrote several scientific treatises.

V. MANUAL TRAINING.

While the Rabbis had differing views as to the influence

of foreign culture, or as to the extent to which the education of women should be carried, in one respect they were unanimous, namely, in their respect for labor. It was axiomatic in their teaching that every boy should learn a trade. It must certainly seem strange to the reader of history to find in our nineteenth century a race that has honored labor as no other race has, accused of despising manual work, and as being desirous of living on the producers, rather than producing. Nearly all the great teachers of the Talmudic times were workmen. Hillel earned money enough to attend the Academy by wood-cutting. Rabbi Joshua was a blacksmith, others were tanners, carpenters, millers. They practiced what they taught and their teachings are finding appreciation at a time when manual training is coming to the front. "Labor was truly worship with them." Here are a few of the Talmudic sayings about work.

"Great is labor! it confers honor upon man, elevates the man who works, and brings support to the family."

"Choose any work and say not; 'I am a great man, a priest.'"

"The father who does not teach his children a trade, virtually brings him up to be a robber."

"The study of the law without occupation of labor will finally be interrupted and end in sin."

Work and study formed the principles of the educational system of the Talmudists. Study for the noblest purposes and not for money—work because it is man's duty. By this union was formed that intellectual force which we have said is a marked Hebrew characteristic.

There were no "middle ages" in Jewish history. While intellectual darkness prevailed in Christian lands, Hebrew Academies and schools for higher learning flourished in Toledo, Cordova, Narbonne, Padua and Rome.

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